

Blueprint for the Millennium: An Analysis of Regional Hearings on Assistive Technology for People with Disabilities

Fall 1998

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www.ed.gov/offices/OSERS/NIDRR

Prepared for The National Institute on Disability and Rehabilitation Research

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The Assistive Technology and Systems Change Project is fully funded under Contract #HN94040001 from the National Institute on Disability and Rehabilitation Research of the U.S. Department of Education to United Cerebral Palsy Associations.

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INTRODUCTION

Imagine a world without attitudinal, structural, and learning barriers. Imagine what all people could achieve in this barrier-free world. As we near the close of this century, technology makes a barrier-free world more possible. In 1998, the National Institute on Disability and Rehabilitation Research (NIDRR), the Federal agency responsible for funding programs and services authorized by the Technology-Related Assistance for Individuals with Disabilities Act of 1988 (Tech Act; PL 100-407) and its 1994 amendments (PL 103-218), set out to determine America's thoughts about assistive technology (AT) and the role of AT in eliminating barriers for persons with disabilities. This project began as the 10-year funding period for some States under the Tech Act was ending. Therefore, the project provided an excellent opportunity to gauge past AT successes and failures and to find new ways to expand access to and use of AT by people with disabilities.

From January through April 1998, NIDRR gathered input from hundreds of individuals who told their stories in Arlington, VA; Redmond, WA; Kansas City, MO; Boston, MA; and Tallahassee, FL. These hearings were coordinated by the Rehabilitation Engineering and Assistive Technology Society of North America (RESNA); the Washington Assistive Technology Alliance; the Missouri and Kansas Assistive Technology Projects; the Massachusetts and New Hampshire Assistive Technology Partnerships; and the Florida Alliance for Assistive Services and Technology. Each of these lead agencies collaborated with Tech Act projects in their regions to plan and publicize the program, find and prepare witnesses, staff the hearings, and edit transcripts. The testimony at each hearing had a strong local focus, and taken together the testimony paints a vivid picture of the power and promise of technology to meet the needs of persons with disabilities. The hearings addressed such issues as advocacy, employment, rural and cultural issues, education and lifelong learning, aging, housing and transportation, financing, research and development, and managed care.

Through in-person accounts, audio and video teleconferencing, and written commentaries, NIDRR panels heard about struggles to find quality technology that best met individual needs, frustrating experiences trying to learn and use assistive technology, and bureaucratic and service problems with school districts, vendors, manufacturers, and providers. The hearings allowed people to reaffirm their support for assistive technology through personal stories of success in classrooms, workplaces, and communities. The successes of the past and the challenges and dreams of a better future for persons with disabilities provide the blueprint for Federal assistive technology policy in the next millennium.

It was also clear in the hearings that, in the 10 years since the passage of the Tech Act, there has been enormous technological change affecting every aspect of life and every member of society, particularly those with disabilities. For anyone interested in the history of disability or the evolution of disability during this period, no subject demands greater attention than assistive technology (AT). Efforts to develop AT policy for the new millennium should consider the following developments:

- the rise of the Internet as a dynamic modality for information exchange;
- the growing centrality of computers and other technologies in schools and workplaces;
- the dramatic increase in awareness of, utilization of, and demand for devices by persons with disabilities and the mainstream organizations or institutions that interact with them;
- the incorporation into public policy of specific legislative provisions dealing with the role and availability of technology within service systems designed for people with disabilities;
- the rise of managed care as a major factor restricting the availability of various health care services, including technology-related services;
- the decentralization or devolution of program administration from the Federal to the State level, with the result that States exercise increasing discretion in the management of all human services programs, thereby making such programs less uniform from place to place; and

- new expectations of people with disabilities and others regarding inclusion, equal opportunity, and related matters as exemplified in the Tech Act, the Rehabilitation Act Amendments of 1992 and 1998, the Individuals with Disabilities Education Act Amendments of 1997, the Telecommunications Act of 1996, and the Americans with Disabilities Act of 1990.

Despite increases in the numbers of individuals with access to AT, many people still lack access, for various reasons that are discussed in this report. In addition, as the population ages, the need for assistive devices increases. Technological changes are occurring so rapidly that we need to simultaneously remove barriers to technology and continually adapt the currently available technology.

The common barriers to acquisition, use, maintenance, and upgrade of AT were apparent in every substantive area of testimony presented throughout the hearings, including the areas of education/lifelong learning, managed care/health insurance, the financing of assistive technology, business/marketing/technology transfer, employment, transition, and services for older Americans. Some of the barriers include:

- lack of products with a "universal design" that allows them to be used by all individuals, and lack of an accessible "built" or physical environment, and lack of accessible telecommunications, information technology, and transportation;
- lack of information in numerous areas that ultimately affect an individual's ability to access AT;
- lack of coordination and fragmentation of responsibilities across services and throughout an individual's life;
- lack of coordinated legal advocacy resources that protect individual rights to AT devices and services;
- lack of training of users, families, and professionals in the role and potential of AT, and in the evaluation, comparison, selection, maintenance, funding, and interfacing of AT alternatives; and
- lack of sufficient financial incentives to individuals and businesses for improving access to, and availability and use of, assistive technology.

The main section of the report describes the major issues presented during the five hearings, while possible solutions and interventions that can address barriers identified during the hearings are discussed in Appendix A.

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INTEGRATING TECHNOLOGY SYSTEMS AND INDIVIDUAL TECHNOLOGY

One of the major themes of all five hearings was the need for individualized technology, interfaces, and systems technology to be complementary and integrated. This issue is an essential part of the vision for the 21st century because it cuts across all facets of society and affects the lives of all those who currently use or could benefit from assistive technology (AT). The benefits resulting from the combination of systems technology and individual technology are consistent with the purpose of the Americans with Disabilities Act, the service-related provisions in the Individuals with Disabilities Education Act, the Rehabilitation Act Amendments, the Older Americans Act, the Telecommunications Act, and the Technology-Related Assistance for Individuals with Disabilities Act (Tech Act). "There is an historic opportunity for the disability community to influence rapidly developing mainstream technologies. These mainstream technologies offer the promise of built-in accessibility which in turn offers attractive economies of scale and improved compatibility with existing assistive technologies when accessibility of mainstream products is not possible." (Judy Brewer, Director, Web Accessibility Initiative, World Wide Web Consortium, Boston, Massachusetts, March 25, 1998)

The testimony presented at the hearings includes emotionally vivid and intellectually persuasive accounts of the need for and the role of AT. It also includes powerful arguments and examples of the crucial role of universal design. For example, testimony of the Universal Access/Telecommunications panel at the Arlington, VA, hearing on January 15, 1998, makes it clear that technology cannot achieve its fullest impact unless AT and universal design policies are developed in combination, not separately, as typically has been the case. This traditionally separatist approach must change, because only when AT and universal design are seen as part of a single system can the potential of either be fully realized.

For example, in recent years, a primary goal of public policy has been to address access to buildings and facilities by people with disabilities, particularly people with mobility disabilities. From the standpoint of people who use wheelchairs or other mobility technology, the functional ability to go places and do things requires two fundamental components: availability of mobility aids and the space in which to use them. For physical access to be achieved, people need mobility aids such as wheelchairs, and buildings must have ramped or flat entryways, accessible bathrooms, doorways wide enough to accommodate wheelchairs, and elevator buttons low enough to be reached from a sitting position. Without the progress that has been made in the design and, especially, the availability of mobility devices, however, the inclusion of these accessibility features in the design of these new buildings would not necessarily have resulted in a dramatic change in day-to-day life. Similarly, without the incorporation of accessibility into building design, advances in AT and its increased availability would have yielded little progress for people with mobility impairments.

Thus, unless both sides of the equation were addressed, the value of progress in either AT or universal design would have been severely limited.

We faced comparable issues in the accessibility and usability of our nation's transportation systems. If public transit vehicles were not equipped with lifts, "kneeling" steps, and other accessibility enhancements, the benefits of rehabilitation and of mobility technology would be much less than they have been. In many cases, without attention to accessibility in the design of such vehicles, no technology currently available to individuals would be sufficient to facilitate independent access to public transportation.

Even today, issues in transportation access for persons with sensory and cognitive impairments remain largely ignored by the public transportation sector. If station stops or major intersections are not routinely announced by operator, people with visual disabilities are at a severe disadvantage. If people cannot successfully use ticket vending machines because the instructional sequences are complex or require a very rapid response, access is likewise compromised.

In all sectors of transportation, new technologies, such as ticketing and boarding pass machines at airports that are intended to make access to transportation easier for everyone, are creating new barriers to access for people with disabilities. Given the range of technologies and disabilities, no single approach can resolve all situations. Only a comprehensive mix of AT, universal design, and human services will be adequate to eliminate all of the barriers.

Yet what institutions or mechanisms exist within the transportation industry, the disability community, and government for systematically evaluating these issues? What institutions or mechanisms exist for bringing transportation designers and customers with disabilities together in a broad-based effort to anticipate problems and to develop and implement the solutions?

In the communications environment, the need for coordination of "individual technology" and "public technology" presents some of the most complicated issues. Two examples will illustrate how only the right combination of individual and public technology can create the range of functional capabilities that people with disabilities want and need.

For example, people with hearing impairments can use hearing aids successfully in various settings. But in auditoriums, public meeting rooms, or similar venues, hearing aids alone will not suffice. Additional public technology, such as assistive listening systems and voice amplification, is often required. Yet, not only is this public technology frequently not available to supplement the individual technology, but, in an attempt to "get close to their audience," speakers take off their lapel mikes and move away from the podium and thus effectively exclude all those with hearing disabilities.

The hearing aid alone cannot assure total access to public telephones either, because they are only part of the equation. In order for a hearing aid to function properly, the telephone must be designed with adequate compatibility design features. Those who make the decisions about such compatibility features in pay phones are manufacturers, Congress, and the Federal Communications Commission. Citizens can and should try to affect these decisions, but knowing when to speak out and what to say is not always easy.

Another example of the need for convergence between individual and public technology and between AT and universal design is access to the Internet for people who are blind. Synthetic speech output for computers and screen-programs that verbalize what is on a screen are well developed. But they rely on text that they can "voice" in order to offer meaningful access. Information presented graphically is thus rendered inaccessible to those who have visual disabilities. Similarly, computer operating systems that respond only to the pointing and clicking of a mouse and do not accommodate user control by keystrokes are unusable by computer operators who are blind or who have difficulties with controlling the movement of their hands.

The pace of technology development in the communications area has been so rapid that designers of information access products for people with visual and other impairments have been forced to play catch-up. But in the current environment, screen-reader software and text-oriented Web browsers do not—and cannot—provide or allow access unless the designers of operating systems and Web pages incorporate accessibility into their products and services from the very beginning of the design process.

Individual and public communications technology intersect where decisions are made about who should be responsible for access and how access will be achieved. Many people believe that specialized developers within the disability community should continue, with the cooperation of mainstream industry, to bear primary responsibility for access through the design of peripheral devices and access software. Others maintain that only integrated design, carried out by mainstream industry itself, can provide the required features needed for access in today's communications environment.

The need for information/communications access is most urgent in educational settings. As computers become a more important teaching tool, as the Internet becomes a major resource for student study and research, and as multimedia formats supplement or replace traditional textbooks, the issues surrounding access, participation, and learning for students with a variety of disabilities grow more important. Without adequate AT in the classroom, these resources and media will remain at least partly inaccessible. Without attention to accessibility in the design and selection of these educational technologies, investments in AT in the classroom and on behalf of individual students are likely to yield progressively less and less return.

In all the areas discussed in this chapter—BE the physical environment, mobility devices, architecture, transportation, and communications —BE the details differ but the issues are largely the same. Yet the question of how the costs and responsibility for access are to be allocated has yet to be systematically addressed by public policy. How can the needs of people with disabilities be articulated and made understandable to the designers of mainstream industry? How can the expertise and experiences of the disability community be united with the resources of industry and mainstream commerce? How can mainstream designers and vendors overcome the legal barriers that inadvertently interfere with the cooperation and collaboration that may be necessary to ensure seamless and integrated design? How can resources be allocated to facilitate continued development of AT while maintaining support for progress in universal design, and how can the priorities in each area be developed with a recognition of the priorities of the other? How and by whom can fundamental decisions be made about the mix of individual and public technology that will best serve the goals of access and full participation in various situations? And how should the costs and benefits of access ultimately be defined and measured?

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THE NEED FOR INFORMATION RESOURCES IN ASSISTIVE TECHNOLOGY

Knowledge is power. Whether the end user is a young child with disabilities or an aging adult, access to timely and reliable information about the range and scope of technology devices and services remains an important unmet need. It was apparent in each of the five regional hearings that the impact of Technology-Related Assistance Act has been to increase awareness among with disabilities, educators, employers, and the general public. However, several phenomena have intensified the demand for reliable, timely, and accessible information about technology-related products and services for individuals with disabilities. These include:

- the explosion of new information technology products and technology innovation in the marketplace (Bonnie O'Day, Committee Member, National Council on Disability, Arlington, VA, January 15, 1998);
- the continuous improvements being offered in new AT products;
- the gradual adoption of universal design principles in mainstream hardware and software products;
- the increasing numbers of infants and toddlers who are surviving life-threatening conditions (Angela Patterson, Program Manager, ITECH Center, Helping Parents, The Family Resource Center, Redmond, WA, March , 1998); and
- the numbers of individuals who are aging¹ (Mitchell LaPlante, Demographic Trends, Disability Statistics Program, Arlington, VA, January 15, 1998).

Witnesses at the NIDRR hearings consistently named the lack of timely information as one of the key barriers to accessing appropriate technology (Collen Long, Systems Analyst, Safeco Insurance Company, Redmond, WA, 4, 1998). In fact, the need for local, State, and national sources of timely information about technology devices and services has intensified since passage of the Tech Act in 1988. The demand for AT is rising; as the population ages, this trend will accelerate (Mitchell LaPlante; Rosemarie Myrdahl, Lieutenant Governor, State of North Dakota, Kansas City, MO, 18, 1998; Anne Long Morris, Geriatric Manager, American Occupational Therapy Association, Arlington, VA, January 15, 1998).

Information needs mentioned by presenters at the hearings did not focus only on products to enhance mobility, communication, learning, daily living, work, and recreation. The needs also focused on customization of products to individual needs, training for effective utilization, cost and financing options, ongoing maintenance and repair issues, comparative analysis of products, and places to try or purchase products. Several presenters also testified regarding the lack of information and knowledge on the part of individuals with disabilities and family members about their rights under laws governing various service systems (Michael Kluk, Senior Attorney, California Protection and Advocacy, and Matt Knotts, Lead Advocate for Protection and Advocacy for Assistive Technology at the Disability Law Center [Utah], Redmond, WA, March 4, 1998; Tom Hlavacek, Director, Wisconsin Coalition for Advocacy, Kansas City, MO, March 18, 1998).

Information and referral efforts have been part of the work of a large number of State Tech Act projects as well as the national technical assistance efforts of the United Cerebral Palsy Associations' Assistive Technology Funding and Systems Change Project. Many State programs have developed AT resource directories and funding manuals to help their citizens become more knowledgeable participants in the AT selection process. The national technical assistance projects have collected, analyzed, and disseminated useful information that provides comprehensive overviews and important analyses on timely AT issues that reach across States and territories. The dissemination efforts of the national technical assistance projects along with those of the State Tech Act projects have contributed significantly to the growth in grassroots and community awareness about AT; yet they may also have helped create an appetite for more information than can realistically be provided under the current funding structure.²

Marketing and dissemination of information about new technology products for the general public are often backed by millions of dollars in advertising, and information is distributed through major retail electronics and computer stores as well as on-line. Therefore, for the consumer of mainstream technology, sources of information are bountiful, and informal opportunities to examine and compare devices and systems are readily available. An individual considering which computer or toaster to buy can readily examine and compare numerous models in stores or in other people's homes and offices. Individuals deciding which power wheelchair, closed-circuit TV magnifier, or teletypewriter device to buy have less access to information. Comparative information is scarcer for AT products with even smaller customer bases that have no national distribution chain and very limited resources behind them.

"Information about the access needs for people with disabilities and the market potential of goods and services for this population are not known among appliance, software, and other manufacturers and designers of products. For example, at this time, new computers are being designed for multimedia environments which contain built-in speech chips. If designers understood that many potential users need speech as an option for accessing information on the screen, it would be easy and inexpensive to design these new machines in a way that would accommodate that need. Since computer companies and manufacturers do not have this information, they are designing the new generation of machines in a way that will allow no user preference for which modalities (visual or audio) can be used to access information." (Bonnie O'Day, Arlington, VA, January 15, 1998)

It is not only manufacturers and product designers who need information about technology, however. Testimony at all of the hearings by parents, professionals, and persons with disabilities confirmed the need for reliable information and training not only for the end user and family members, but also for continuing education for professionals across the disciplines of health, education, and rehabilitation. "Individuals with disabilities and family members have expectations that educators, therapists, and rehabilitation professionals have current knowledge about the assistive technology products that would most likely respond to individuals' needs." (Anne Holcomb, Executive Director, York County Parent Awareness [Maine], and Joel Mittler, School of Education, Long Island University [Bronxville, NY], Boston, MA, March 25, 1998)

Much rethinking in curriculum design and in continuing education for a host of allied health care and human services professions will be needed to enable the medical, social services, and geriatric care systems to respond effectively to the imperatives and opportunities of AT. What information these professionals will need and how that information can be incorporated into the fabric and language of their respective disciplines are questions that should occupy us all in the decade to come.

Many of the issues involved in the employment of individuals with disabilities were articulated in the testimony of one witness who stated,

"A significant communication barrier seems apparent between the business and disability communities. Each finds the other's culture mysterious and often intimidating. We have been conducting workshops for employers for 7 1/2 years, and it is apparent that employers, rehabilitation professionals, and people with disabilities need to learn more about each other. Individuals with disabilities need to learn more about the business world and the mindset of employers. Business, on the other hand, needs to become more informed about disability laws, disability culture, and resources available for accessing and funding assistive technology supports.

Employers are not knowledgeable about the cost of adaptations to the workplace. Many fear that accommodating an individual's disability is expensive when, in fact, accommodations are relatively inexpensive. For example, an inexpensive adaptation to a telephone may result in use by a valuable employee who would otherwise have not been able to hold a job. These few dollars of investment will allow an individual who would otherwise be dependent on public benefits to obtain a living wage and much valued health benefits." (Shelley Kaplan, Southeast Disability and Business Technical Assistance Center [Atlanta, GA], Tallahassee, FL, April 2, 1998)

Information technology is the fastest growing sector of our nation's economy. The Internet has become a preferred resource for timely information, recreation, social and business communication, service delivery, and commerce. State Tech Act projects and national technical assistance projects have extensively used the Internet to gather and disseminate information. While these efforts have been effective, reliance on the Internet raises new and troubling issues, including ensuring the accuracy of information, monitoring to prevent information from becoming dated, and providing enough background and context to make the information meaningful to the broadest range of users.

Use of the Internet also raises important questions about design. This valuable resource should be accessible 24 hours a day, 7 days a week, for all Americans with disabilities. However, the technology design community seems to be unaware of the needs of individuals in this regard, often inadvertently designing technology that is inaccessible to people with disabilities. As multimedia formats come into wider use, the complexities associated with this dimension of information access may well increase.

There is also a general lack of knowledge about public and private financing options (other than publicly funded direct service systems). Employers, health care professionals, educators, rehabilitation specialists, individuals with disabilities, family members, and advocates are not aware of existing tax incentives, loan programs, and equipment recycling opportunities. Current and potential AT users do not have the information they need because of a general lack of awareness about AT and its benefits. For individuals with disabilities, many of whom are isolated because they do not have the technology they need, this is a vicious cycle. They need technology to get information about technology. For many individuals with disabilities, AT may mean the difference between remaining in the community or being institutionalized. Ideally, the future solutions should cut across barriers imposed by lack of awareness, geographic location, time, and access. Manufacturers of mainstream products need to learn about universal design principles to reduce the need for specialized AT products.

Integrating an individual with technology needs into society requires that technology be available everywhere (e.g., in the bedroom, the classroom, the supermarket, the retail store, the doctor's office). This integration can occur only if a variety of individuals have access to adequate information. It is important for architects and engineers, along with AT users, to play a significant role in the design and construction of facilities and equipment. Manufacturers of mainstream products need information about what should happen to make a vast array of goods accessible to all individuals. Personnel in various health disciplines need information about what technology can do for potential users, what technology is available, who can perform the necessary evaluations, and what needs to happen to make technology work. Identifying how to provide necessary consumer and resource information, in a context that makes it meaningful, is an important consideration of technology policy in the years to come.

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FRAGMENTATION OF RESPONSIBILITIES ACROSS SERVICES AND LIFE SPAN

Many witnesses addressed the fragmentation of the service delivery system and the need for coordination of efforts and resources among various participants in the assistive technology field. In view of limited funding, expertise, comparative product information, and technical support, these witnesses regarded lack of coordination among service systems and among other participants in the field as a significant barrier to full and effective utilization of AT.

Statutory requirements for coordination, collaboration, and consultation to address the fragmentation in services to people with disabilities, and particularly in AT services, are widespread and can be found in almost every major statute dealing with disability oriented programs. If statutory mandates were the solution, we would have coordination by now. Efforts to deal with the coordination problem have likewise been long-standing. In the statutory context, these efforts have included:

- establishment of transition planning as a required service under the Individuals with Disabilities Education Act (IDEA) for students preparing to complete their special education programming in school (IDEA Amendments of 1997 [29 USC Sec. 1401 et seq.]);
- incorporation of transition planning requirements under the Rehabilitation Act for State vocational rehabilitation agencies (Rehabilitation Act [29 USC Sec. 701 et seq.]);
- inclusion of coordination, review, and statewide planning processes in the developmental disabilities and independent living areas (Rehabilitation Act, [29 USC Sec. 701 et seq.]);
- establishment of requirements for agency responsiveness to consumer needs (funded under Title I of the Technology-Related Assistance for Individuals with Disabilities Act [Tech Act 29 USC Sec. 2201 et seq.]);
- development of frameworks and structures for the transfer of technology from Federal laboratories to the commercial marketplace (Tech Act 29 USC Sec. 2201 et seq.); and
- the commissioning by NIDRR of periodic studies of the effectiveness of the AT delivery system regarding consumer needs and an analysis of future direction in AT policy (Tech Act 29 USC Sec. 2201).

That assistive technology must be easily obtained in order for people with disabilities to truly become valued members of society is a deeply held belief that is articulated in the core values embedded in the Tech Act. Despite the fact that the Tech Act articulates core values regarding the desirability of AT's broad availability and use, however, there is no mandate that this be true of the systems and agencies that are responsible for the provision of AT. The progress that Tech Act programs have made in moving toward coordinated systems is largely based on provision of technical assistance and education.

Although our nation has various research, educational, informational, and technical assistance resources, none of these can respond effectively to a delivery system for AT resources to end users in which there are a number of separate service systems, each of which meets specific needs of particular categories of people.

"Within this framework of categorical services, each of these systems approaches AT very differently. Even when a person is eligible for services from more than one of these systems, the criteria used by these systems for identifying and meeting technology needs are not the same. This is frequently confusing, but it can be far more serious than that when their criteria conflict, or when the acquisition of AT from one source risks the loss of services from another." (Jenifer Simpson, CoChair CCD Task Force on Telecommunications and Technology, Arlington, VA, January 15, 1998)

The coordination barrier also results in people having to begin the eligibility determination and service planning processes from scratch each time they enter a new service system. It causes great delays and gaps in the availability of AT devices and services, which can have adverse consequences for any serious and sustained life planning. "Agencies often have no mechanisms for transferring ownership of AT devices already in use. One agency director testified that when a student is transitioning from school to work, the appropriate AT devices that were used effectively in school and could also be used in job training or placement do not accompany the individual. They must be replaced pursuant to the evaluation and planning processes of the State vocational rehabilitation agency." (Richard Luecking, TransCen [Rockville, Maryland], Arlington, VA, January 15, 1998)

Several State Tech Act projects have addressed the problem of coordinating the transfer of ownership from schools to vocational rehabilitation services, jobs, and higher education. State initiatives include the development and passage of legislation in the State of Washington that facilitated transfer of assistive technology, and implementation of a model program in the State of Indiana that clarified ownership issues through work with the State and the Federal Office of Management and Budget.

The Assistive Technology Funding and Systems Change Project located in Washington, D.C., developed a widely disseminated and cited policy brief that discussed the relevant laws and policies, barriers to equipment transfer, suggestions for removing these barriers, examples of successful initiatives, and action steps for AT users, families, advocates, service providers, and others interested in reform in this important area. (A copy of this policy brief, *Transition of Equipment from School to Work*, can be downloaded from http://www.ucpa.org/html/innovative/atfsc_index.html.) In addition, the project has requested that the U.S. Department of Education give guidance to State officials by clarifying the right to transfer AT between school and post-school education and services.

Not only do different service systems frequently maintain contradictory criteria, but they also often attempt to shift costs without regard to the interests or needs of the individual. Their purpose is, generally, to save money or avoid establishing a precedent that could later be costly. For example, even though school districts have ultimate responsibility for providing devices and services, school districts will often refuse to fund a device, claiming that funding is the responsibility of the private insurer or Medicaid. While it is true that funding may be available under either of these funding streams, a school district cannot use the potential availability of funding through another source as a reason to deny a benefit to a student. The school district must insure that another program, or the school district itself, will provide funding for AT in a timely manner.

"Transition planning and coordination are required by Federal law; however, these requirements are not monitored or enforced even when required by the law." (Johnita Williams, parent of older student, Kansas City, MO, March 18, 1998) In all likelihood, an agency or administrator would not have been penalized for failure to effectively coordinate with another agency in meetings the needs of individuals eligible for services. Even where effective transitional processes have been established, they tend to depend on the trust among individual employees and managers of various agencies, particularly at the local level. When personnel change, the relationships often break down.

"Lack of a coordinated service system is also a serious problem for individuals who are aging." (Karen Howard, Walton Options for Independent Living [Augusta, GA], Tallahassee, FL, April 2, 1998) At present, none of the service systems that provide AT for individuals with disabilities has a mandate to assist older people in avoiding institutionalization and remaining in their homes through the provision of assistive technology. While neither the Medicaid nor the Medicare statutes specifically mention AT, a number of the services provided as part of Medicaid have been interpreted to include AT. The Medicare program, the principal source of health insurance for older persons, generally takes an especially narrow view of AT. The only Medicare service that readily can be used to include any technology is durable medical equipment (DME). But as DME is currently defined, most AT devices are categorized as "convenience items" or as noncovered rehabilitation.

The relationship between AT and other services within particular programs also gives rise to coordination problems. Major advocacy efforts recently have been directed toward incorporating personal assistance services into Federal law. This effort proceeds from the premise that such services will minimize the number of people requiring institutional care and will allow people, including people with disabilities and older persons, to remain in their communities and homes. While some possibilities may exist under pending proposals for the provision of home modifications and other AT, broad-based discussion of the coordinated role of AT largely has been absent from the debate. "The Virginia Consumer-Directed Personal Assistance Program is one of the few Federal or State programs to bundle assistive technology and personal assistant services into one payment source with the ultimate aim of increasing the independence of its consumers. This and other model independent living programs deserve further research in order to determine their long-term cost effectiveness and the outcomes impact of combining assistive technology and personal assistant services into one program." (Dr. Philip Beatty, National Rehabilitation Hospital Research Center, Arlington, VA, January 15, 1998)

As the personal assistance services debate suggests, while coordination may be a key goal in many legislative proposals, no mechanism exists for identifying and flushing out the technology-related implications of various legislative initiatives dealing with disability policy. The same is true of initiatives dealing with technology. The implications for AT are seldom discussed or considered. As technology enters more and more profoundly into all aspects of people's lives, coordination becomes more and more complex. Questions about the implications of many policy initiatives for AT and its users are likely to become both more critical and more complex. Serious debate and discussion needs to be initiated on these key issues.

It is important that policies of all the major service systems (i.e., education, vocational rehabilitation, Medicaid/Medicare) be developed with reference to one another, and in light of shared goals for the role of technology. "Ideally, our nation would have a seamless system for defining and meeting what we regard as the legitimate role of society in responding to the opportunities created by AT." (Jenifer Simpson and Susan Tachau, Parents of children with disabilities, Arlington, VA, January 15, 1998) In the absence of such a consensus, the issue becomes how to achieve the greatest possible degree of coordination, continuity, and consistency in the operation of programs that often have very different goals and that arose to meet distinct and specific needs.

Our concern here, based on the testimony of witnesses at the hearings, is confined to achieving a higher degree of coordination among the programs with significant involvement in, and with express responsibility for, AT. The testimony produced a number of key suggestions that could contribute significantly to achieving existing legal goals regarding interagency programming, transition services at various points in the life span, and other elements of coordination. These suggestions appear in Appendix A.

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LEGAL ADVOCACY SERVICES

In almost every benefits program and civil rights statute directed toward individuals with disabilities, Congress has included the right to individualized appeal, first to a disinterested decision-maker and thereafter, if necessary, to the courts. Congress also has recognized the need for legal advocacy where there is ongoing rapid technological change, as in the development of assistive technology (AT) devices and services. Congressional support for legal advocacy for individuals with disabilities is long-standing. Statutes dating back to the 1980 Developmental Disabilities Assistance and Bill of Rights Act and, most recently, the 1994 reauthorization of the Technology-Related Assistance for Individuals with Disabilities Act of 1988 (Tech Act) incorporate legal advocacy. To assure that people with disabilities have appropriate representation when exercising their rights to appeal an adverse decision, Congress established a national system of protection and advocacy agencies (P&A) in each State.

Witnesses at the NIDRR hearings confirmed the importance of individual appeal rights and the right to professional legal representation. One witness described these issues in terms of the managed care revolution in publicly and privately funded health insurance: "Managed care itself has spawned the need for government-imposed consumer protections.... First, every consumer should have access to meaningful protection and grievance procedures they can use when services are denied and delayed. When these procedures are exhausted, there should be an external review of treatment denials, including denials for assistive technology, as several States have already done." (Don Sloma, Deputy Commissioner for Health Policy, Washington State Office of Insurance, Redmond, WA, March 4, 1998)

Other witnesses at the public forums as well as those who submitted written comments confirmed that the benefits of legal representation for individuals with disabilities in public programs, such as IDEA, Medicaid, and Medicare, as well as private programs, such as health insurance, cannot be overstated. The fact that extraordinary pressures exist in all of these programs to reduce spending and that these pressures sometimes lead to decision-making errors was stated repeatedly throughout the hearings.

Witnesses also made it clear that, in some cases, program rules, policies, and practices are simply out-of-date and do not recognize current advances in technology. Absent a right to appeal and a complementary right to legal representation, individuals with disabilities will not be able to correct decision-making errors or compel replacement of outdated policies.

"People with disabilities experience a severe power imbalance when confronting some of the bureaucracies and funding sources set up to serve them. This has always been the case. AT is just one of the things people need that the system may be reluctant to give them." (Tom Hlavacek, Kansas City, MO, March 18, 1998) In addressing this power imbalance, people with disabilities and their families have employed a range of strategies. These include: asking politely, wheedling and negotiating, cajoling and compromising, being the squeaky wheel, knowing the local school board member or county supervisor, knowing the smart durable medical equipment provider, hooking up with peer advocates, using the media, and so on. Sometimes aggressive legal advocacy that forces the system to obey the law is necessary.

Legal advocacy services are a vital tool for people with disabilities; without this tool, some people will not get the AT they need and deserve. Furthermore, having legal advocacy services available increases the likelihood that other forms of advocacy will be more effective. The ability of legal representation to ensure that individuals with disabilities gain access to and funding for AT devices and services has been demonstrated for more than 15 years by the P&A systems. With such access and funding, individuals with disabilities have achieved the outcomes predicted: "to be more independent, self-confident, productive, and integrated into the mainstream of society."³

Legal representation is not synonymous with adversarial confrontation or lawsuits. It is a key component of the range of advocacy activities that create systems change. As much has been accomplished around a conference table and in legislative chambers as in administrative hearings and in courtrooms. For example, one member of a State P&A agency testified about his office's consulting role to Utah's Managed Care Improvement Project, an initiative funded by the Governor's Council for People with Disabilities (Matt Knotts, Assistive Technology Program Specialist, Utah Disability Law Center, Redmond, WA, March 4, 1998). Similar activities were also reported by representatives of another Tech Act project and P&A agency (Suzanne Elrod, Director, Texas Assistive Technology Partnership, Austin, TX, and James Comstock-Gallaghan, Texas P&A, Tallahassee, FL, April 2, 1998).

Comparable services have been and continue to be rendered by P&A systems throughout the country. For example, in regard to augmentative and alternative communication (AAC) devices, the Minnesota Disability Law Center worked with its State legislature and the Minnesota Department of Human Services to write legislation that will provide expanded access to augmentative communication devices, and Legal Services of Central New York, a legal support provider for the New York State Protection & Advocacy System, and South Dakota Advocacy Services (a P&A agency) worked with their State Medicaid programs to develop AAC device-specific funding criteria. The outcome of these efforts has been to expand and make more predictable the coverage and funding of devices that enable their users to communicate.

As described by witnesses in every region, the scope of legal representation through P&A systems for people with disabilities has ranged from corresponding with benefits and funding programs, to negotiating policy reforms, writing and responding to legislative proposals, pursuing administrative appeals, and filing court actions. As a result of these efforts, individuals with disabilities have secured necessary AT devices and services such as augmentative communication devices; hearing aids; aids to vision such as closed-circuit television systems; powered mobility devices; orthopedic car seats; other seating and positioning devices such as custom wheelchair seating systems and bathing aids, lifts, computers; and environmental control devices (Tom Hlavacek, Kansas City, MO, March 18, 1998; Mike Kluk, Senior Attorney, California Protection & Advocacy, and Matt Knotts, Redmond, WA, March 4, 1998; Tim Sindelar, Senior Attorney, Disability Law Center, Massachusetts Protection and Advocacy, Boston, MA, March 25, 1998).

In addition to the benefits that accrue directly to the individuals who pursue these appeals, legal representation through the appeals process has led to systemic changes that affect entire populations or programs. The broadest expression of systemic effect is found in court decisions in Mississippi, Texas, and Florida. In the course of specifically rejecting States' exclusion of AAC device coverage, these court rulings laid out a general analytic framework for determining a recipient's right to any form of treatment under the Medicaid program. As a result, the rulings in these cases have nationwide implications.

Other administrative appeals and court cases have had comparable scope or impact. For example, they established the extremely important general principle that coverage for assistive devices can exist under more than one benefit category, and a recipient's ability to prove entitlement under any covered benefit is sufficient to obtain access and funding for the device.

Another general principle=BE the duty of decision-makers to be knowledgeable about the kinds of devices being sought=BE has been adopted as a core principle of the Health Care Consumer's Bill of Rights. The principle has been extended to Medicare and Medicaid programs by executive order and is pending as a legislative proposal for mandated application to all health insurance and health benefits plans.

Other cases have been the catalyst for official changes in national policy regarding specific benefits. In Medicaid, the provision of nursing services for persons who are dependent on ventilators or other technology has become the law. The decision in a single AAC device case in Texas (that struck down age-based coverage distinctions for these devices) has been the catalyst for the elimination of similar barriers in AAC device cases (e.g., Colorado, Florida). This has resulted in elimination of coverage barriers for children throughout the country and has established that AAC devices, as a form of treatment, are medically necessary. Less dramatic, but no less important than the administrative appeals and cases with nationwide implications, are those that affect only State level policies and practices, such as the scope of the State's notice requirement when issuing decisions about assistive devices.

Another achievement is the almost complete eradication of all formal policy barriers to State Medicaid program coverage of AAC devices. Other statewide policy barriers eliminated as a result of individual appeals with legal representation have been State Medicaid program barriers to bath chair coverage (Utah); orthopedic car seat coverage (New York, Utah); van lift coverage (Colorado, New York); low vision aid coverage (Vermont); custom seating and positioning inserts (Minnesota); environmental control devices (Massachusetts, Minnesota, New York); arbitrary caps on payment for ventilators and AAC devices (Wisconsin); arbitrary caps on payment for wheelchairs for persons dually eligible for Medicaid and Medicare (California, Maine, Montana); arbitrary limits on the scope of home health nursing services (Connecticut, New York, Vermont); and the elimination of State refusal to provide assistive devices needed solely by a single person who resides in a nursing facility (Connecticut, New York). Many other challenges, with statewide policy implications, are currently awaiting final resolution.

Legal representation helps individuals with disabilities to assert both the right to AT devices and the right to individualized appeals. In addition, legal advocacy contributes greatly to the process of system change. Absent legal representation, systems would be much less responsive to the needs of individual with disabilities, and fewer individuals would have AT services and devices that enable independence.

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EDUCATION AND LIFELONG LEARNING

Background

Education is critical to our nation's success. Education also is critical to individual success in securing meaningful work and living a fulfilled life. Recognizing the importance of education, President Clinton has made education a top priority in his administration. Today, technology is playing an increasingly important role in enhancing teaching and learning in classrooms across the country. Technology has made it possible for students with physical, sensory, cognitive, or emotional disabilities to participate more fully in, and benefit from, the educational environment. Assistive technology allows these students to actively participate and become more independent learners. These educational opportunities in turn enable more students with disabilities to become productive members of their communities and to compete on more equal footing as adults.

The 1997 amendments to the Individuals with Disabilities Education Act reinforce the important role that AT can play in the education of students with disabilities. For the first time, the statute explicitly states that individualized education plan (IEP) teams should consider the AT needs, if any, of every special education student. The statute also requires States to develop interagency agreements to ensure coordination with other agencies that serve children with disabilities, including public insurers such as Medicaid, and agencies that provide transition services such as State vocational rehabilitation programs.

Adults with disabilities face similar issues as they attempt to further their education throughout their lives. Computerized instruction, distance learning, and the Internet are just a few of the technologies used by people with disabilities. Access to these technologies should be available to people of all ages with disabilities.

As with many AT issues, concerns about education and training have multiplied and become more complex. Not only are the products and processes of AT constantly changing, but the issues being considered today, especially in relation to education and training, are very different than those of 10 years ago. At the core of the service delivery movement are the individuals who interact daily with people with disabilities. In the 10 years that the Technology-Related Assistance for Individuals with Disabilities Act (Tech Act) has been in effect, a large foundation of experiences has been built. From this foundation, possible solutions can be drawn regarding who needs training, what they should be trained in, and how that training should be delivered. These issues require immediate attention. As documented in the testimony gathered by the assistive technology hearings, the American public and its educational institutions can wait no longer to design a comprehensive education and training strategy and infrastructure around AT issues.

Complex Factors in AT Education Training

Technology is now a fundamental part of most Americans' lives. Studies of purchasing behavior show that many individuals constantly seek newer and better devices. Although technology once was perceived as a luxury, it now has become a necessity. This is especially true for people with disabilities. Yet, for this population, selecting and purchasing appropriate technology is extremely challenging. Some of the most effective AT devices require a long "learning curve" before they can be assimilated into an individual's life, making it even more crucial that the buyer and the technology be appropriately matched. An increase in the aging population, coupled with public policy changes that affirm the rights to AT for children and adults with disabilities, multiply almost exponentially the numbers of individuals needing assistance. Because every person's education and training needs are different, the development of appropriate programs becomes very complex.

Many types of individuals in many different environments need training and technical assistance. For example, an 8-year-old child with a motorized scooter needs training in how to control the scooter's momentum. A teacher needs training in how to write IEPs that incorporate AT. Rehabilitation counselors need information about a wide range of devices and how to obtain them. A Medicaid claims examiner needs training in how to determine if claims qualify as durable medical equipment. Design students need an integrated curriculum to learn how to design accessible features in passenger trains. Parents need training to help children program their augmentative communication devices, while a psychiatrist needs information on assistive devices for patients with traumatic brain injury. A landscape architect needs training on how to design a totally accessible city park, including a playground for children with and without disabilities. In fact, almost anyone can be a customer for AT education and training. The list of individuals includes people with disabilities, family members, physicians, nurses, architects, builders and contractors, and claims reviewers and others in the insurance industry. Obviously, rehabilitation counselors, evaluators, special education and regular teachers, rehabilitation engineers, audiologists, gerontologists, and speech, language, physical, and occupational therapists also would fall into this category. As these examples illustrate, policymakers are challenged in devising programs to meet these disparate needs.

Vendors also need to receive ongoing training to upgrade their skills, so that they can be effective members of the assessment team, help individuals obtain funding resources, and assist with equipment upgrade and repair. "They [suppliers, vendors] don't understand what funding is available and how to get it. I think that at the supplier/vendor level they tend to take the path of least resistance. They tend to want to steer people toward equipment that they know they can get reimbursed for instead of maybe understanding or looking at other ways that more effective equipment can be purchased for people." (Bob Swiney, Sales Representative for Quickie Designs, a division of Sunrise Medical, Kansas City, MO, March 18, 1998)

All these groups need thorough, ongoing education and training. Such training must not only be tailored to each group's informational needs, but must address additional challenges such as those posed by geography, economics, and awareness. For individuals in rural areas, who already face barriers in finding qualified personnel to deliver services, access to training may also be limited because their communities are too small to house such training institutions as community colleges. In addition, several individuals from Puerto Rico, Alaska, a Navajo Reservation, and urban areas spoke about the need for training conducted in native languages and the use of a curriculum that respects cultural differences.

Other barriers to training involve funding, transportation, and information. Individuals with limited economic means may not have the funds to pay the registration and travel costs. They may also lack the accessible transportation needed to get them to the training events. And, sometimes individuals in great need of information and skill building may simply not know about the resources available or where to go to get this information.

Initial Steps to Approach AT Education and Professional Training

"Just to reinforce or state the challenge . . . in terms of educational environments: Really, the people who are the experts on impairment/disability are worlds apart, buildings apart, campuses apart, from those who are in design. At the University of Washington, the concept of universal design has made it into our school of architecture, and those folks are dealing with it. But it hasn't really translated to other areas. Business schools, as an example, have been a very hard group to get into to talk about anything related to the Americans with Disabilities Act or the more ambitious universal design. We need creativity in trying to set up networks that don't generally exist on their own. They have to be really creatively organized at the campus training level." (Brian Dudgeon, Occupational Therapist, University of Washington, Department of Rehabilitation Medicine, and Doctoral Candidate in Education for the University of Washington, Redmond, WA, March 4, 1998)

"We know that a lot of our teachers are coming to us out of the institutions of higher learning without technology training. In talking today to a university professor, the person estimated that only 20 percent of the institutions of higher learning are providing technology training to their teachers. So we have a huge barrier there." (John Mick Moore, Executive Director, Special Services Department, Puget Sound Education Service District, Redmond, WA, March 4, 1998)

"Only 10 to 15 percent of the rehabilitation counselors [in the State of South Carolina] make 100 percent of the AT referrals." (Anthony Langton, Rehabilitation Engineer, Tallahassee, FL, April 2, 1998)

Training for professionals is defined as one or more courses related to providing awareness of AT or in-service training building upon the skills of professionals. Many educators recognize that established pre-service curricula for teachers, vocational rehabilitation personnel, allied health personnel, architects, business students, and engineers is sorely lacking in current AT information. These same individuals also understand the difficulties in tackling bureaucratic systems in order to change established curricula and competencies. Their testimony indicated that, for the most part, it would be difficult to add additional material and hours in existing programs. Nonetheless, the difficulties should not be weighed against the necessity. The need for AT information, devices, and services will continue to grow, and educational curricula needs to address the acute shortfall that currently exists in the number of personnel qualified to provide not only disability services but also public and commercial services to individuals with disabilities. Appendix B contains information on curricula, formats, and outcomes for different target audiences, including teachers.

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ALTERNATIVE FINANCING

The Need for Financing Options

Problems with the affordability of assistive technology (AT) devices and services were common themes for presenters at all five hearings. Access to appropriate and effective technology-related assistance is most often dependent upon third party funding. Despite the positive efforts at systems change at local, State, and national levels during the past 10 years, entitlement to public funding of AT devices and services is not self-enforcing. Amendments to the Individuals with Disabilities Education Act (IDEA), the Rehabilitation Act, policy interpretations of Medicaid/Medicare laws and regulations, and legal precedents established under the Americans with Disabilities Act have all added to a framework of financial support for technology assistance in the home, classroom, and workplace. Despite these positive efforts, witnesses at each hearing described substantial barriers to funding AT through public education, rehabilitation, and health care service systems. As the number of individuals with disabilities and their need for AT increases, the current strain on available public and private third-party funding sources is likely to worsen.

Questions about financing can be raised at many points along the AT continuum, for example, basic research and product development (who pays and for what research?), marketing and distribution systems, consumer purchase, maintenance, and post acquisition support. Similar questions surround the issues of AT services and the need for coordination, as well as the funding, evaluation, training, purchase, and installation of AT devices.

Our nation never has had a policy regarding who should receive AT. What we do have is a number of service systems—vocational rehabilitation, special education, and public health insurance (Medicaid and Medicare)—that have, in various ways, acknowledged and met some of the AT needs of the specialized populations they serve.

In both vocational rehabilitation and special education, AT devices and services have achieved statutory recognition as items or services that can be provided to recipients of services. But in neither system is the governing Federal law clear that AT must be provided where it could be useful. Instead, these statutes mainly require that the State agencies and school districts implementing the programs take AT fully into account in their evaluation and planning with those they serve. Based on this procedural requirement, the Federal laws leave it to the implementing agencies to decide, under the facts of each particular case, when AT would be appropriate and what technology should be provided. "There is a reluctance of Medicaid agencies to purchase newer technology. I think every time new technology is developed, those of us who are advocates with people with disabilities see it as an opportunity for freedom. Medicaid agencies see it as an opportunity to have to spend more money." (Wendell Matas, Owner, Wheelchairs Northwest, Redmond, WA, March 4, 1998) Under Medicaid and Medicare, no explicit acknowledgment of AT exists in the law. If AT is available, it is because it is included in other service categories such as prosthetics/orthotics, speech pathology, or durable medical equipment. Eligibility for any of these services, let alone for AT as one of the modalities by which the service will be provided, depends on an assessment of the case, and in particular upon a determination whether the item in question is medically necessary.

Special education and Medicaid often are described as entitlement programs. But as far as AT is concerned, these systems offer no guarantee that AT will be provided on an entitlement basis. Although initial determinations about AT need and appropriateness by school district individualized education plan teams or by Medicaid authorization reviewers can be appealed, most individuals are not familiar with the appeals process and are hesitant to embark upon it without skilled representation.

The Technology-Related Assistance for Individuals with Disabilities Act and other statutes have emphasized the importance of teaching consumers self-advocacy skills for acquiring or accessing technology. But the deeper question of why self-advocacy should be so necessary is not often asked. One need only look at the services that vocational rehabilitation, special education, and Medicaid routinely provide to recognize that AT holds a lower status than other services in the consciousness and in the competition for resources within these systems. Within each of these programs AT is a recent add-on, competing for funds and for top priority with many other critical and often long-established services that these systems provide.

The Tech Act was the first major Federal legislation to address AT as a subject worthy of Federal interest and support in its own right. State Tech Act programs, established under Title I of the Act, have done a great deal to increase the availability of funding for AT. Through their "systems change activities," the seeding of revolving loan funds, input into new regulations and policies, and stimulation of public awareness of AT, these programs have improved AT funding. But these programs were never designed as primary sources of direct funding for AT. Given the limited resources available to them, it would be impossible for them to play this role, and indeed it would be poor public policy for them to do so.

Separately and in combination, the major service programs do not have sufficient resources to meet the growing demand for AT. Additionally, third party funding currently is inadequate to meet the needs of today's end users. "As we look at what the researchers are telling us, an estimated 20.3 million families, or nearly a third of the nation's 69.6 million families in America, have at least one family member with a disability that limits daily activities or mobility." (Michael Morris, United Cerebral Palsy Associations, Arlington, VA, January 15, 1998)

As important as the need for increased AT funding is, a person's acquiring of AT depends on receiving an appropriate and accurate assessment of AT needs. Today's AT does not lend itself to neat compartmentalization based on identification of a single purpose, even though AT devices that meet a medical need often can be used to meet educational or vocational objectives as well. An accurate and expert assessment of an individual's AT needs currently is difficult to obtain, and an inaccurate or inexperienced assessment may deny a person necessary AT. Consequently, this lack of AT may severely limit or diminish a person's quality of life.

Even when entitlement to AT is established, the role of the end user in its selection may be far less than today's citizens expect. Despite efforts in vocational rehabilitation and education to include recipients and families in planning and decision-making about services, these service programs remain limited in their ability to accommodate the full range of individual preferences and situations.

Enhancing Access to AT

People with disabilities have continued to look for new funding strategies and models that expand the pool and accessibility of funds while allowing potential AT users to have maximum autonomy in identifying their technology needs and the devices and services that will best meet these needs.

Most people with disabilities do not have the private financial resources to simply go out and purchase the AT they need. Various mechanisms exist by which public policy can, often with little or no direct expenditure of public funds, facilitate and encourage the availability of funds for the purchase and provision of AT. Through loan programs, tax law clarifications, small business development programs, and numerous other means, creative public policy can significantly enhance access to AT.

New mechanisms are needed to increase the supply of funds for AT devices and services, but these new strategies must do so in ways that do not require increases in levels of public expenditure. Such new or enhanced funding must not undermine other worthy and pressing policy goals and must not create conflict within the disability community among the advocates of AT, personal assistance services, or similar programs.

To be effective, it will be necessary for new initiatives to increase the available pool of funding for AT and create incentives for the participation of private funders. Initiatives also must be designed to give the fullest possible scope to the autonomy and self-directed life planning of consumers with disabilities. And finally, such new programs will need flexibility to accommodate rapid change in the nature of available mainstream technology and AT.

Conclusion

The momentum generated by the passage of the Tech Act paralleled America's increasing interest in and use of technology. For this reason, the new millennium brings with it hope for new and better technology and services that will expand universal design and enhance the quality of life of children and adults with disabilities.

Many individuals believe that there is considerably more knowledge and recognition of AT because of the programs and services delivered by the State Tech Act projects. Throughout the hearing process, witnesses repeatedly voiced their support for their State projects. It was felt that the momentum driving much of the demand for AT devices and services is a direct result of information dissemination and advocacy work conducted by these projects.

Individuals spoke of the continuing need for research and development that is consumer directed and closely aligned to practice. Repeatedly, individuals marveled at the vast array of devices that are brought to the marketplace, but also voiced their frustrations about the difficulties of actually obtaining these devices. In addition, inventors and manufacturers are woefully short of capital for innovation. Each year, new regulations are promulgated that further restrict funding and categorize who can access devices and use services, and when they can do so.

Technological devices are not beautiful items to be encased in a protective covering and placed on a shelf where they can be seen but not touched, bought, or used. As stated in this Blueprint for the Millennium, there are several ways to enable individuals to take items off the shelf and put them to use. There is a need for ongoing and expanded activities to provide information about AT devices, services, funding, and resources. This information is sought by individuals of all ages in the community, workplace, school, and home. There needs to be an expansion of funding mechanisms, including public and private partnerships, that will make more dollars available for micro-loans, research and development, and enhanced service delivery. Advocacy efforts could be broadened to ensure that those needing devices and services would be able to find professional support to help champion their causes. There needs to be a systematic effort to increase the numbers of qualified personnel to provide AT services in the schools, communities, and workplaces.

The accomplishments of the past 10 years are laudable. Individuals who were thought not capable of communicating, moving around their communities, going to school, or working competitively are now participating more fully, thanks to technology. Realistically, however, we have only just begun. This Blueprint clearly outlines the challenge we face in expanding AT and universal design over the next 10 years while responding to the millions of individuals with disabilities who can benefit from these tools.

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Endnotes

- Statistics give ample evidence of emerging trends. According to statistics from the U.S. Department of Health, Health Care Financing Administration, (National Health Interview Survey, Disability Supplement, Washington, DC: U.S. Department of Health, 1994), wheelchair use increased from 1980 to 1994, and hearing aid use increased significantly from 1990 to 1994.
- The authors of this paper, the Assistive Technology Funding and Systems Change Project, developed and disseminated an information brief presenting criteria to include when developing policy related to AT for this population. A follow-up survey showed that nearly 100 percent of the State directors reviewed this brief and that 20 percent stated that some action had been taken as a result of this effort by the project.
- National Council on Disability, Study on the Financing of Assistive Technology Devices and Services for Individuals with Disabilities, A Report to the President and the Congress of the United States, Washington, DC: National Council on Disability, 1993.

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Appendix A. Possible Solutions to AT Barriers

The following section contains proposed solutions and interventions to ameliorate the barriers identified in the hearings. The solutions correspond to the six sections of the report.

Section I - Possible Solutions for Integrating System and Individual Assistive Technology

1.1

Coordinate the research and development of systems and the individual technology that most frequently with them.

This project bases its solutions and interventions on the premise that policies that encourage or support efforts at universal design are good. Yet, just as research into assistive technology (AT) by itself is not the appropriate solution to all problems, instances also will inevitably remain in which universal design is technically or economically difficult. Unless coordinated efforts continue in both AT and universal designs, research and development runs the risk of yielding far less in effective solutions and improved access than it might otherwise. Development of AT and of universally designed technology must be undertaken with reciprocal awareness and knowledge, or much of the effort on either side will result in failure or in needless duplication of effort. We need to further explore strategies to bring about a seamless technology environment that will ensure access and full participation in society for the greatest number of people at the lowest and most rationally allocated cost.

1.2

In order for the necessary systems, practices, and relationships to be implemented, changes and reforms are needed on several levels. There needs to be changes in awareness, law, and practice.

- Communication between industry and the disability community over physical, transportation, and information systems design issues can be encouraged and reinforced. This involves a personal commitment from many individual and organizational stakeholders. It also requires public sector efforts aimed at fostering communication and partnerships. Local programs have both persons with disabilities and representatives of industry in their constituencies, but need to facilitate effective linkages.
- Government procurement practices could reward companies that actively reach out to include people with disabilities in focus groups or customer research. Publicly funded research and development projects could address access issues, both in their planning and in their expected results.
- Existing laws dealing with accessibility need to be reviewed. A special national commission, jointly appointed by the President and Congress, could be convened to determine how access can best be achieved. Laws in need of review as part of this assessment include:

(1) the Architectural Barriers Act (to determine whether its scope could be broadened to include communications barriers);

(2) the Rehabilitation Act (to assess whether the rehabilitation system could, without reducing its commitment to individualized service, reasonably be expected to do more to support the deployment of accessible public technology);

(3) the Individuals with Disabilities Education Act (to determine whether the unique issues surrounding AT funding for individual students and accessibility of mainstream school technology require utilization of different funding formulas or decision-making models than currently apply to special education);

(4) the Internal Revenue Code (to highlight the tax incentives that already exist for AT and for reasonable accommodation expenditures by small business, and to create incentives for universal design that would prove cost-effective for society as a whole); and

(5) the numerous laws governing public contracts and procurement (to implement the most effective strategy for ensuring that Federal funds will be spent only on facilities, technologies, and services that are as accessible as possible).

The commission also could review antitrust laws to ensure that they do not impede cooperation among industry sectors or among mainstream and AT developers in the development of standardized platforms and protocols. These laws would include accessibility mandates as a condition for the licensing of hardware or software, or the sharing among competitors of information needed to ensure accessible design. Patent, trademark, and copyright law also could be reviewed to ensure that companies that cooperate in multiparty or cross-industry accessibility efforts will not risk the loss of important proprietary or confidentiality rights to techniques or information. These intellectual property laws also could be reviewed to add provisions that would provide incentives for companies that, on their own or in conjunction with disability-oriented organizations or firms, implement accessible design in their products and services.

1.3

The National Institute on Disability and Rehabilitation Research (NIDRR) could be authorized to conduct a study of the range of Federal efforts in technology research and dissemination. This study could determine how well these efforts serve the goal of accessibility. The study also could identify barriers to the incorporation of access considerations into these efforts, delineate coordination mechanisms to minimize duplication of effort or projects that operate at cross-purposes, and determine the best mix of resources between AT and mainstream universal technology research.

Today, an accessible technology infrastructure is desirable and possible. The key question in the public policy agenda is how to best create an accessible world for all in view of the tremendous costs of doing so. "We must extend our vision beyond Tech Act reauthorization possibilities to a larger picture that reevaluates and rethinks relationships and purposes of RERCs (Rehabilitation Engineering and Research Centers), technology development discretionary grants under IDEA (Individuals with Disabilities Education Act), universal design principles under the Telecommunications Act, Section 508 of the Rehabilitation Act, technology infrastructure development in the schools, our tax policy, and other public and privately funded R & D (research and development) efforts." (Michael Morris, United Cerebral Palsy Associations, Arlington, VA, January 15, 1998)

For some purposes, individual technology represents the strategy of choice. For others, public technology is the most sensible, if not the only viable, course. In many instances, public funds, drawn from already available resources, can meet the need for public investment. And in others, the expectation that private funds can and will be used is entirely reasonable.

What all interested parties face today is a debate, not over the value of accessibility, but over the most appropriate means for achieving it. Advancing this debate requires some assessment of the costs and benefits, and, more important, some consensus about the allocation of costs. Through NIDRR, Congress and the Executive Branch could initiate the dialogue involving members of industry, the disability community, academia, and the public that will begin to build consensus and clarity. "Our multidimensional strategy for the next millennium should not be primarily based on perpetuating government subsidies. It should be about promoting individual choice and control, motivating private sector involvement, creating new incentives for partnerships that recognize technology as a necessary means to promote productivity and independence." (Michael Morris, United Cerebral Palsy Associations, Arlington, VA, January 15, 1998)

What add-on costs does industry foresee in various contexts, and how does it estimate the market implications of meeting them? What will be the costs and benefits to society of reorganizing existing service programs to invest more in meeting public technology needs? What advantages to U.S. technology in world trade would result from embracing accessibility? What is the optimal allocation of cost among the public sector, the private sector, and the end user for incorporating access into our technology?

None of these questions have simple answers, but as the new millennium dawns, answers can be sought. With a dynamic economy, an industrial sector of unequalled creativity, a labor market desperately in need of the skills and services of all willing persons, and a population that is aging and will increasingly need assistive technology, a profound and urgent question must be asked: How will accessibility be achieved? Working out the mix of individual and public technology is, in turn, key to finding the answers. Only if the question is asked can the effort at finding the answers go forward.

Section II - Need for Information

The problems articulated in testimony throughout the hearings point to the lack of information that is available and disseminated to key stakeholders, including individuals with disabilities, advocates, researchers, vendors, and service professionals. This information vacuum is apparent at all levels (local, State, and national) and across all disciplines (health, education, work, and rehabilitation). The following are possible solutions to the serious gaps that remain and are likely to continue unless solutions above are implemented.

2.1

National information and technical assistance projects could conduct the following activities:

- Serve as the point-of-entry for all collection, analysis, and dissemination of information related to AT from all federally funded sources. These sources include research and training centers, Congress, all executive agencies with linkages to AT devices and services (e.g., Departments of Education, Health and Human Services, Transportation, Veterans Affairs, and Labor), technology-related businesses, Americans with Disabilities Act (ADA) disability business and technical assistance centers, innovative state programs, and parent training and information centers. A key purpose would be to provide information, guidance, and opportunities for exchange as well as to maximize outreach efforts to various constituencies, including small businesses, parents, individuals with disabilities, community-based organizations, schools, child care providers, colleges and universities, and corporations. The information collected and disseminated will be up-to-date, accessible in a variety of formats (electronic as well as print), and written in styles to accommodate the needs of the various constituencies.
- Facilitate peer and information exchange among researchers, practitioners, individuals with disabilities, and family members for the following purposes: (1) ensure that the results of research and demonstration projects are made widely available in a timely manner and translated into language that increases their utility for the constituencies; (2) ensure that the disability community and the community at large are aware of the newest developments in AT policy and service delivery; (3) ensure that multiple modalities (e.g., e-mail, World Wide Web, chat groups, print, video, audio tapes) are used to reach the broadest possible audience, including individuals with disabilities, families, vendors, and researchers in product development; and (4) ensure that researchers and practitioners are made fully aware of consumer priorities and needs on a regular and timely basis.
- Synthesize above information and documentation collected as part of (a) and (b) and disseminate these materials in nontechnical, user-friendly, plain English terms packaged in accessible formats, to reach the broadest range of interested individuals and organizations around the country. Follow up on dissemination efforts to determine the usefulness of the information and what further information and technical assistance are needed.
- Launch a major public education campaign designed to educate the general public about the potential role of AT in the lives of people with disabilities or people who do not regard themselves as disabled but who have functional limitations to which AT could be responsive.

2.2

"The statewide and intrastate entities focused on assistive technology should be expanded to meet the geographic accessibility requirements of more individuals." (Don Zimmerman, Minnesota, Kansas City, MO, March 18, 1998) Centers that are supported with public and private funding could meet this need. Each center would be responsive to the needs of end users with disabilities, educators, employers, procurement specialists of government agencies, and others to bridge the gap in knowledge, understanding, and sensitivity toward accessible and affordable technology that enhances independence and productivity.

Some of the activities that may be conducted by the centers could include:

- providing opportunities for people with disabilities and their families, policymakers, service providers, employers, procurement specialists, educators, and the public to see, touch, try, compare, and learn about information technology hardware and software systems designed for maximum accessibility incorporating the application of universal design principles;
- providing information about options, reliability, and costs from end users and technology professionals;
- assisting and advising State agencies about effective software and AT options and rights to AT to fully comply with Federal and State laws;
- assisting and advising employers about effective approaches to full accessibility of information technology across the range and scope of disability to meet the reasonable accommodations standard of the ADA;
- sharing expertise on home, classroom, and workplace modifications that continue to improve information technology accessibility across locations;
- creating linkages to, and collaborations on, activities with the information technology industry, from research and design efforts to employment and training opportunities that lead to unsubsidized work for people with disabilities in the fastest growing sector of our nation's economy; and
- sharing information on public and private financing options including work incentives to increase access to and availability of information technology systems and, where needed, AT devices and services to enhance learning, productivity, and independence.

The following citations underscore the need for more and better coordinated information systems:

"The families we serve whose children could benefit from assistive technology want to know what is available, what research says about its effectiveness, who is qualified to evaluate their child's needs, the names and locations of vendors that can get it for them, and how to pay for it. When they [doctors] come out of medical school, they don't have a clue.... Parents of children with disabilities have expectations that educators, therapists, and rehabilitation professionals have current knowledge about the possible assistive technology products that would most likely respond to individual needs." (Anne Holcomb, Boston, MA, March 25, 1998)

"The single most important thing that can be done to overcome the challenges of technology faced by disabled users is awareness among the general population." (Collen Long, Systems Analyst, Safeco Insurance Company, Redmond, WA, March 4, 1998)

"As technology is more important today than ever, there is an increased need for information and training about assistive technology." (Rosemarie Myrdal, Kansas City, MO, March 18, 1998)

"The older adult reported that access to this new information [about assistive technology] enabled skill mastery of key aging-in-place strategies which enhanced personal and instrumental ADLs [activities of daily living]." (Anne Long Morris, American Occupational Therapy Association, Arlington, VA, January 15, 1998)

"The explosion of technology development, the shortening of the amount of time it takes for any particular technology to become out-of-date, means that we are seeing an increase in the need for people to have access to information about technologies and to have access to information about matching technologies with particular needs." (Dr. Nancy Safer, Executive Director, Council for Exceptional Children, Arlington, VA, January 15, 1998)

"It is predicted that by the year 2010, when the baby boomer generation begins to retire, the demand for assistive technology will be even greater. Clearly, information is needed across the life span for families from infants to older Americans." (Mitchell LaPlante, Demographic Trends, Disability Statistics Program, Arlington, VA, January 15, 1998)

"I want to point out another growing population that has not been mentioned here today=BE very young children and children still to come." (Angela Patterson, Program Manager, ITECH Center, Parents Helping Parents - The Family Resource Center, Redmond, WA, March 4, 1998)

"There are five elements that have been identified as having significant impact on service delivery in rural areas....The community structure may focus on family- and community-level solutions for the problems and with communication and information dissemination occurring primarily between individuals instead of groups....Our agency began a partnership with the Iowa Program for Assistive Technology [IPAT] in 1992. . . . IPAT provided the kits to each of the 99 counties in Iowa and we've been able to . . . provide one or more information centers to elders through congregate meal sites, Meals on Wheels, senior centers and in homes." (LaHoma Counts, Executive Director, Eldenberry Area Agency on Aging, Kansas City, MO, March 18, 1998)

Section III - Fragmentation of Services

3.1

Coordination and cooperation could be integrated into the funding formulas for discretionary and categorical funding under relevant service programs.

Many examples exist in categorical grant programs, and now even in block grant programs, of use of performance measures to determine the amount of money States and localities receive. These techniques can be applied directly to Federal agencies as well. There are many ways in which coordination of efforts, pooling of resources, appropriately monitored sharing of data and findings, co-ownership of AT devices, and other indicators of coordination can be measured and factored into funding formulas.

This approach also lends itself well to fostering public, nonprofit private sector, and for-profit private sector partnerships. Traditionally, in programs that involved the combination of Federal and matching private funds, private dollars have leveraged Federal money by helping meet the match requirements for receipt of these Federal funds.

3.2

Standards and procedures could be established to give operational meaning to current transition requirements that exist in law.

"Equipment initially purchased in whole or in major part with Federal funds can be transferred from the ownership of any one federally funded program to any other federally funded program when such transfer is undertaken to facilitate transition or to provide for continuity of service to an individual." (Richard Luecking, Arlington, VA, January 15, 1998) Policy guidance to this effect has been issued by OSERS (see June 1998 letter from Judy Heumann to Susan Goodman).

Depreciation schedules could be developed to determine, without any need to negotiate on a case-by-case basis, how much could be charged back to represent the value of the equipment. Such depreciation schedules or formulas would be based on the cost of the equipment when new, on its current age, and on its normal life span. Models of depreciation schedules can readily be found in the used car industry.

States could be required to review their laws and regulations to certify that they present no barriers to the kinds of transfers discussed in this chapter and to guarantee the removal by the end of the next regular legislative session of any such barriers that the review discloses. State allocations under IDEA and the Rehabilitation Act could be subject to increases or decreases based on evidence of cooperation, including development and use of integrated service plans for transitioning students, shared payment for AT services, shared contracting with evaluation personnel or training resources, and other indicators of active and ongoing cooperation. In all cases, it is suggested that the fiscal impact on both programs be the same, so that each is equally responsible and blame shifting can be avoided.

Measures could be taken to legitimize dual-use technology and services and to provide formulas for allocating the costs of such AT expenditures. Just because an AT device can be used in one sphere of life does not negate its availability from service systems that concern themselves with other spheres. For example, if a device would be medically necessary to facilitate communication in the home, the fact that it could also be used for this purpose in school should not be a barrier to its provision by Medicaid. Likewise, the fact that a device needed in school can and should also be available at home (primarily but not exclusively for homework and related practice) should not be a barrier to its provision by the special education system or to a student's being permitted to take the device home.

A relatively simple and straightforward solution to these and similar jurisdictional problems is new funding formulas and supporting service definitions to eliminate the turf battles in which so many people who need AT have been the ultimate victims. Efforts have been made to eliminate these situations, but in the absence of procedures for shared funding, and in the absence of service categories that would justify funding of some services or devices in whole and others only in part, these provisions have not proved effective. Therefore, IDEA and the medical assistance provisions of Title XIX of the Social Security Act could acknowledge mixed use or dual use services or devices. These services and devices are those that qualify for funding if strictly medical or strictly educational in nature, but which, because their real purposes encompass both, are now difficult to fund under either program alone. "In addition to supporting and training school personnel on the ever-changing assistive technology devices and services, we also need to continue to work towards establishing and strengthening a system that is easy to understand and can respond to new technologies and policies." (Susan Tachau, Parent of a child with a disability, Arlington, VA, January 15, 1998)

"For most, the journey to today's workforce involves interaction and services from a number of entities and organizations. For some, it begins with school-based programs; others with a community rehabilitation provider or vocational rehabilitation [VR]. Almost all will have interaction with VR as they plan and move toward the world of work. Assistive technology is, or should be, a common thread between these programs. From the consumer's perspective, the various programs and agencies usually do not work together, and their technology needs, if they have any, are attended to on a fragmented, piecemeal basis." (Anne Long Morris, American Occupational Therapy Association, Arlington, VA, January 15, 1998)

"Our vision depends on Federal, State, and private involvement. As has been the case since DATI [the Delaware Assistive Technology Initiative] began, our Federal support and mandate gives us a neutrality that makes it easier for different State-level players to come to the same table with a focus on the vision, rather than on each other's turf. The vision requires conceptual and financial commitment from agencies and districts for maintenance of an adequate inventory, operation of technical support teams, and for administrative and logistical support. Located at the core of the multiagency collaboration, DATI can facilitate interagency agreements and other forms of cooperation that make AT access more consistent. The average cost of providing services under Operation Independence is \$600 per person, and funding to provide this service has come from a variety of sources. One of the biggest barriers to this program is the color of money. Nearly every funding source comes with its own restrictions and policies for use. There have been periods of time when someone with a severe disability has had to wait for many months to receive services because they did not fit into one of the categories of funding available at the time." (Beth Mineo Mollica, Director, Delaware Assistive Technology Initiative, Arlington, VA, January 15, 1998)

Section IV - Advocacy

4.1

It is important that individuals with disabilities have continued access to professional advocacy services to enforce their individual rights to AT devices and services.

The achievements noted in the public forum testimony and the broader historic record, as illustrated above, provide a solid foundation for the conclusion that it is both necessary and appropriate for there to be ongoing support for professional advocacy services to assist individuals with disabilities in enforcing their rights to AT devices and services. More important, whatever the successes to date, the need for legal representation for individuals with disabilities remains as essential today and in the future as when it was first considered and supported almost two decades ago. The pressures to control costs are as pervasive now as ever, and change continues to occur in the administration of programs, such as managed care. Congress continues to amend disability program statutes, such as the IDEA Amendments of 1997, and court interpretations of existing program standards are not permanent.

The methods of enforcing legal rights have evolved, and many innovative techniques have been developed to support access to and funding for assistive devices. One example is the NIDRR-supported initiative by 15 states that developed a national model policy related to AAC device evaluation, coverage, and decision-making by Medicaid programs, pursued a common strategy that eliminated policy barriers to AAC device coverage in 13 states, led to adoption of AAC device decision-making criteria in 4 states, was directly responsible for funding of more than 60 devices, and, as a result of policy changes, has since been responsible for funding for more than 100 devices.

A second example is the current effort as part of the Assistive Technology Funding and Systems Change Project through Neighborhood Legal Services (the current national legal technical assistance provider) to pursue a five-pronged strategy. This strategy will expand Medicare coverage for AAC devices by writing and then promoting a legislative proposal to direct coverage by pursuing negotiations with the Health Care Financing Administration over Medicare policy reform and by developing a public information campaign and providing extensive advocacy supports to Medicare beneficiaries who elect to pursue individual claims and appeals, and also by initiating advocacy supports to State Medicaid programs so that they can pursue Medicare appeals on behalf of their recipients with dual Medicare-Medicaid eligibility. Viewed as a whole, the enactment of laws, promulgation of rules, and writing of policies related to the rights of individuals with disabilities to access and receive funding for AT devices and services cannot be deemed complete without the right to individualized appeal and legal representation.

4.2

Advocates need continued access to national legal and advocacy technical support services. "The need for national technical assistance for assistive technology is also critical." (Matt Knotts, Lead Advocate, Protection and Advocacy Centers [Utah], Redmond, WA, March 4, 1998) This critical need has already been acknowledged by Congress and the National Council on Disability. Both recognize that legal representation, the right to individual appeal, and a provider of national technical assistance are all necessary to protect the rights of individuals with disabilities to AT devices and services.

There are at least four reasons why a support provider is required. First, there is a great disparity between the number of individuals with disabilities who are participants in or recipients of programs providing benefits and funding and thus are afforded civil rights protections, and the number of legal advocates capable of providing legal representation to these individuals. In addition, the complexity of these programs makes it difficult for any advocate to claim "expertise" in all areas. "The constantly changing landscape of policies, laws, and regulations challenge advocates to stay abreast of the emerging issues and how they are related to the selection, acquisition, and delivery of AT devices and services." (Matt Knotts, Redmond, WA, March 4, 1998) As a result, there needs to be a resource to which advocates can turn to be able to quickly gain an understanding of benefits and funding programs' scope and purposes, their rules and practices, and successful and unsuccessful advocacy strategies.

Second, these benefits and funding programs and other protections have common roots in Federal laws and regulations, even when responsibility for their implementation is given to State or local governments or private organizations. Thus, as was stated in testimony, the lessons learned in one State may also produce results in others. "But there needs to be some resource (i.e., a clearinghouse) to which advocates can turn to be able to obtain access to potentially beneficial rules, guidance, practice, and decisions from other States." (Suzanne Elrod and James Comstock-Gallagan, Texas Assistive Technology Partnership, Tallahassee, FL, April 2, 1998)

Third, most of the solutions in these benefits programs are reached in informal proceedings and negotiations with decision-makers (e.g., individual education plan meetings, development of local or State policies) or are decisions reached as part of the administrative appeals processes. A national technical assistance provider responsible for gathering and disseminating data about these solutions will offer the most efficient way for advocates in one state to learn what has previously occurred and whether it might be applied successfully in their cases.

Fourth, developing and pursuing innovative approaches to problem solving related to AT access and funding require resources and information as well as time, both of which are in short supply in advocates' offices: the pressures to respond to the demand of individual cases is often too great to develop strategies to address systematic issues. Advocates should be able to call upon a national technical assistance provider responsible for identifying and analyzing trends in benefits and in funding programs' policies and practices, and for proposing new solutions that will expand access to AT devices and services.

In general, a national legal and advocacy technical assistance provider could offer five types of assistance by:

- Serving as an information clearinghouse of informal and formal decisions and strategies that have been applied to AT devices and services funding questions.

A national technical assistance provider could be the repository of "institutional memory" regarding how funding programs have made decisions, particularly for very low incidence devices and services. Through such capability, all advocates can more effectively ensure consistent and predictable decision making for these devices and services. An information clearinghouse also allows advocates to provide examples of funding successes to persuade decision makers that a particular requested device or service is within the scope of a program and is a commonly accepted treatment, and to answer other questions that may arise.

- Synthesizing the diverse decisions in the information clearinghouse to spot trends and to develop new strategies based on analogies that can be applied to expand access to and funding for AT devices and services. An example of strategy development based on a synthesis of prior decisions is the previously mentioned adoption by three court decisions of a general analytic framework for determining a recipient's right to any form of treatment under the Medicaid program. A second example is the development of the legal strategy being used to expand access to Medicare funding for AAC devices.
- Developing liaisons with service providers of national stature and professional associations that are able to provide: technical data about disabilities and forms of treatment, "best practices," analogies among treatments and conditions, expert witness assistance, and amicus curiae (friend of the court) positions to bolster individual cases. An example of this role is the submission of an amicus curiae brief to the U.S. Court of Appeals for the Second Circuit on behalf of 46 national, State, and community-based organizations in *DeSario v. Thomas*, a case that addresses State Medicaid program obligations to cover and provide durable medical equipment.
- Providing hands-on assistance when advocates at any level of ability need help analyzing or researching a problem, pursuing a negotiation, or handling an administrative appeal or court appeal. The scope of this role extends from provision of information in response to a single telephone call to coordination of multistate or national advocacy efforts directed to solve a common problem, such as the previously discussed NIDRR-funded initiative to eradicate policy-based barriers to Medicaid funding of AAC devices and to expand Medicare funding for AAC devices. This kind of hands-on assistance is often the provision of training, which increases the ability of advocates to address similar issues in the future.
- "Our successes are due in part to our ability to work with expert legal advocates who have assisted the Disability Law Center in strategizing and developing an approach to challenge the regressive policies that limit access to AT devices and services." (Matt Knotts, Redmond, WA, March 4, 1998)
- Interpreting statutes, regulations, policies, practices, and prior decisions. As a general matter, individuals with disabilities, service providers, and advocates need explanatory information about the scope, and administrative practices, of benefits and funding programs and other statutes. Only a national legal technical assistance provider will have the time, resources, and credibility to overcome these barriers by producing written analyses of programs and case reports and other supportive information and by coordinating periodic training for all AT stakeholders.

Section V - Education and Life-Long Learning

5.1

As a requirement for accreditation, every college and university could demonstrate that training in AT is integrated into every pre-service program that prepares individuals for regular teaching, special education teaching, vocational evaluation, rehabilitation counseling, occupational therapy, physical therapy, and speech and language pathology.

"The tremendous promise and all of the potential benefits of assistive technology that we have seen and that we have attested to today have not and will not be fully realized without personnel in all of the disability-related disciplines who are knowledgeable about assistive technology." (Lee McLean, Director, University-Affiliated Program, University of Connecticut, Boston, MA, March 25, 1998)

It is not necessary that every department design and conduct its own AT course. Rather there could be an intra-departmental curriculum attended by students from each of the targeted audiences. Education (regular and special), rehabilitation counseling, occupational therapy, and physical therapy students would be in class together, learning about the discipline and how they will eventually practice in a team together. Ideally, the classes would also contain business school and engineering students.

This competency-based training would ensure that these students:

- Gain an awareness of AT services and devices;
- Understand universal design principles;
- Become knowledgeable about Federal and State laws impacting individuals' rights to AT, funding of AT, and access to services and devices;
- Learn how to obtain personal and financial resources to fund AT services and devices;
- Gain and demonstrate services skills in a related discipline (e.g., special education, rehabilitation counseling); and
- Learn how to assess the effectiveness of the AT device or service.

AT information, specific to the discipline, could be integrated into the undergraduate and graduate curricula for business students (the ADA), architects (universal design and ADA guidelines), engineers, medical students, and public administrators.

Disability and related services needs could be integrated as a routine part of practice, rather than as an "add-on service" or requirement of law.

5.3

Publishers could be urged to incorporate information about people with disabilities in elementary school textbooks.

The history of the disability rights movement and examples of how individuals with disabilities have been increasingly integrated in schools, workplaces, and the community because of advocacy, public policy, and AT need to be included in elementary school textbooks; by the time individuals enter postsecondary education, most of their values have already been formed. The time to begin awareness training is when a child starts formal educational instruction.

5.4

Disability services professionals (special education teachers, vocational rehabilitation counselors and evaluators, rehabilitation engineers, physical therapists, occupational therapists, speech and language pathologists), as a requirement for licensing, could be required to take continuing education courses in AT to upgrade skills and knowledge.

"There is also an obvious need for continued awareness training for educators and parents, and I welcome further dialogue related to that. We must develop national enabling mechanisms that ensure that training and assistive technology are provided early. And we must start and continue a national dialogue to prepare university undergraduate and graduate retraining programs in assistive technology, as well as improve and implement standards and credentials to ensure properly trained educators." (Mary Binion, Consultant and Systems Coordinator for the Ohio Department of Education, Division of Special Education, Arlington, VA, January 15, 1998)

Technology changes daily, as do the requirements for access and funding. Skilled professionals will need to maintain ongoing knowledge in order to remain effective as practitioners. As a way to accommodate adult learners, distance education offers instruction at the learner's pace, in the comfort and convenience of home or office. This is very important for working professionals who are already pressed for extra time. Distance education formats, through video teleconferencing and computer multimedia, allow individuals to view field practice and interact with peers and the instructor.

5.5

To address the need for qualified service personnel, Congress could consider funding at least one certified rehabilitation technology training project (for in-service training) in each of the 10 Federal regions.

Funding for training would be granted based on a request for proposal process, with preference given to organizations that offer a collaborative design (i.e., Tech Act State project, area agencies on aging, parent training centers, self-advocacy programs, community rehabilitation programs) and give preference for entry to individuals with disabilities. The funding for training could include stipends for travel and registration, and mechanisms for skill development.

To increase accessibility to information, each of these training programs could offer opportunities for individuals to access the information through distance education formats, such as satellite downlinks, video conferencing, and computer instruction via the Internet. However, to meet the learning needs of students, distance education would not be the only format offered to deliver instruction. Each training project would offer courses using combinations of classroom instruction, distance education, and field practice.

"There is a need for collaboration between the rehabilitation continuing education programs and the Tech Act programs. There is no reason why these two entities cannot collaborate on training design and delivery." (Anthony Langton, The Langton Group, Tallahassee, FL, April 2, 1998)

"There are only 13 higher education personnel preparation programs that now address AT at all." (Debra Bauder, Department of Special Education, University of Kentucky, Louisville, KY, Tallahassee, FL, April 2, 1998)

"Approximately 304,000 students with low incidence disabilities (vision, hearing, mobility, autism, TBI) will need AT written into their IEPs and approximately 564,000 students with high incident disabilities (LD, speech/language, MR, ED) will need AT written into IEPs by July 1, 1998. Training does not currently exist to meet the demand for service." (Diane Golden, Director of the Missouri Assistive Technology Project, Kansas City, MO, March 18, 1998)

"I believe that some of the difficulty that Kansas school systems have is because most teachers, staff, and administrators are, like me, somewhat uncomfortable with much in the technology field because of our unfamiliarity with it. The current trained cadre of 11 people simply is not sufficient to meet our State's needs." (Marnie Campbell, Education Program Consultant, Student Support Services, Kansas State Department of Education, Kansas City, MO, March 18, 1998)

Training programs could also include self-advocacy training. Many individuals with disabilities are inexperienced with and intimidated by bureaucracy and the maze of systems and programs that need to be negotiated. They also may not be aware of their rights to AT. Therefore, as part of the systematic approach to AT, there needs to be self-advocacy training in every state. This could easily be done through existing advocacy organizations, which could link their training offerings to those provided by the regional consortium.

5.6

To address the critical shortfall of qualified personnel, especially in rural areas and areas with high concentrations of Native American populations, Congress could fund the development of paraprofessional programs to recruit and train individuals, including people with disabilities, in the discipline of rehabilitation technology.

"We face a tremendous level of turnover in the adult service system. In some communities in South Dakota right now the unemployment rate is getting close to only one percent, and this has exacerbated that turnover in adult service systems, making this updating of assistive technology issues a never-ending issue." (David Vogel, Black Hills Special Services Corporation, Dakota Works, Kansas City, MO, March 18, 1998)

"Programs and services should be community-based, and information and training should be given to the elderly in their everyday environments and to the persons who provide information to the elderly." (LaHoma Counts, Kansas City, MO, March 18, 1998)

"This lack of sophistication (on the part of service personnel) was also apparent in maintenance and use of prescribed assistive technology. In one case, group home staff literally shelved a device as broken when all it needed was a battery to be charged." (Brian Hartman, Delaware Protection and Advocacy Agency, Arlington, VA, January 15, 1998)

These training programs would be designed to correspond with the culture of the region. Establishing these programs would address two significant issues. First, individuals would be trained in the discipline of rehabilitation technology, which will allow them to: a) provide assessments; b) build-low technology devices; c) assist individuals in acquiring high-technology devices; d) provide training to individuals on software, hardware, and other high-technology devices; and e) assist in or obtain repair and maintenance. Second, personnel preparation programs would help address chronic unemployment problems that frequently impact rural areas and Native American reservations.

5.7

When funding educational technology in classrooms, Congress could ensure that each school district recipient develop a plan that addresses the accessibility needs of children with disabilities and offers solutions on how these children would receive the accommodations necessary to benefit from this technology.

"In the future, Federal and State funding for educational technology should require verification of product accessibility prior to purchase. An independent review mechanism is needed to assist schools in determining the degree to which educational technology products are accessible prior to purchase. The discount e-rate could require assurance of accessibility as a condition for receiving the discount." (Diane Golden, Kansas City, MO, March 18, 1998)

Section VI - Financing

6.1

New activities initiated at the Federal level could include the expansion, identification, evaluation, research, and testing of ways to maximize resources through Federal policy reform initiatives that promote greater availability and accessibility of AT devices and services and the application of universal design principles. Options to consider include, but should not be limited to:

- Development of tax incentives for individuals and corporations;
- Development of investment credits and individual technology accounts;
- Innovation in uses of new revenue resources related to telecommunication (e-rates, cable fees, antitrust penalties); and
- Amendments to the tax code to allow all individual taxpayers to benefit from the positive AT provisions already contained in the Internal Revenue Code (Wilkinson, NYC, written statement).

6.2

The Social Security Trust Fund could be authorized for use as a no interest long-term loan fund for purchase of AT.

This is an approach to achieving independence and self-sufficiency for current Social Security Disability Insurance (SSDI) beneficiaries and current child or adult Supplemental Security Income (SSI) beneficiaries. Use of Social Security (so-called Section 110) trust funds to support the vocational rehabilitation of SSI recipients and SSDI beneficiaries is a well-established practice. These funds were traditionally paid to State vocational rehabilitation agencies to cover the costs of rehabilitation. What is proposed here is an extension of this concept.

Under this approach, a mechanism similar to that governing the Plan to Achieve Self-Support (PASS) would be used. Recipients and beneficiaries with AT goals would be able to borrow, on a long-term basis, funds from the Social Security Administration (SSA) to meet the AT cost elements of their PASS. SSA would maintain discretion to review and approve such requests but would be expected to do so on a time-sensitive basis. In those instances where SSA rejected a proposal, it would also be expected to give reasons why, to meet with the applicant to discuss how the proposal could be improved, and otherwise to institute procedures designed to maximize the number of persons who could utilize this option.

6.3

The Social Security Trust Fund could be authorized as a guarantor of low interest, long-term loans, provided by private financial institutions.

The purpose of suggestions 6.2 and 6.3 is to increase the pool of capital and the availability of capital for the acquisition of AT devices and services by individuals with disabilities. Because suggestion 6.2 could generate only limited resources, additional measures involving partnerships between the public and private sectors are also needed. The mechanism proposed here under suggestion 6.3 closely parallels the familiar procedures used in the guaranteed student loan program, which has contributed significantly to the availability of higher education to many Americans.

Here, utilizing a \$3 private-to-\$1 public matching ratio, Social Security trust fund resources would be made available to guarantee private sector AT loans made by banks, credit unions, or other financial institutions. As with the student loan and other loan guarantee programs, the existence of a guarantee would justify the provision of loans for longer periods of time than would otherwise be included in the lender's portfolio and would warrant the making of loans at below-market (or concessionary) rates of interest.

While trust fund loan guarantees could be available for a variety of AT training, related training, and device purchase activities, their primary objective would be to stimulate small business and micro-enterprise. Working with the Small Business Administration (SBA) to ensure integration of all available resources, Congress could authorize such micro-enterprise loans in amounts of up to \$150,000 for businesses that are majority owned by individuals with disabilities. An 80 percent threshold would have to be maintained at management level. Mechanisms for identifying people and tracking the compensation and benefits paid to key personnel are well established under both the Internal Revenue Code and the Employee Retirement Income Security Act.

Loans under the trust fund guarantee program would, as indicated above, be made at a discounted interest rate. Applicable credit history and debt-to-income criteria also would be modified to reflect the security afforded to the lender by the guarantee. This modification would take into account the economic adversity that often occurs in the personal histories of persons with disabilities, particularly persons who suffer sudden income loss because of the onset of disability during the working years, or the occurrence of disability in a family with health insurance that is inadequate to support the cost of disability.

6.4

Individual technology accounts (ITAs), comparable to individual retirement accounts, could be authorized for individuals who need to save for AT devices or services.

An ITA tax credit, such as the one proposed in suggestion 6.1, will prove of little value to persons whose AT needs cannot be met out of their annual income. For people who need expensive devices, the typical credit would be of little value, since even reduction of taxable income to zero would not generate sufficient funds to pay for the needed devices or services. Various potential strategies exist for using the tax law to meet the cost of "big-ticket" items. Familiar models are the individual retirement account, the experimental and much-discussed individual medical savings account, and a variety of other models.

Under the ITA proposal, taxpayers would be permitted to exclude up to \$10,000 per year to be saved toward the purchase of AT devices or services or for the establishment of AT small business enterprise activities. Funds could not be used for any other purpose. There would be taxation and penalties if ITA funds were withdrawn for any other purpose. No minimum or maximum number of years would apply to the ITA. Permissible uses for ITA funds would include AT devices and services, as well as the purchase of universally designed devices that fulfill the same functions that comparable AT devices would.

6.5

Tax incentives could be given to encourage business research and development to expand and accelerate creation of universally designed and accessible mainstream technology devices.

This would involve the adoption, on an experimental five-year basis, of a telecommunications access tax credit, along with the adoption of related provisions allowing the extension of this credit to other sectors of industry.

6.6

Competitive grants and pilot demonstration projects could be authorized for businesses to develop information technology training programs for unemployed AT users or students.

Recent reports indicate serious shortages of personnel in many critical information technology jobs throughout industry and commerce. High levels of unemployment and underemployment among persons with disabilities suggest that these persons represent a potentially valuable resource for helping to close this gap. To the degree that appropriate technology often represents the key variable determining the ability of these persons to engage in productive work, the development of partnership programs designed to implement technology as a means of facilitating the employment of such persons is particularly appropriate and timely.

All of these programs will have formal relationships with businesses resulting in employment upon "graduation" from the program. Competitive grants awarded under this suggestion could be supplemented by expansion of the work opportunity tax credit. The credit could be available to cover the costs of all technology specifically purchased to facilitate the employment of individuals with disabilities. Additionally, the credit could be available for the hiring of all unemployed individuals with disabilities, not merely, as is currently the case, for those referred by State vocational rehabilitation agencies or those who are recipients of SSI.

To ensure that the credit is successful in facilitating the establishment of long-term and career employment, it could be made available only for individuals who are retained in employment for at least one year. It could, however, also be used (with the same employment duration requirement) to facilitate the return to work by people who previously have been forced into disability or early retirement because of the onset of disability.

6.7

Incentives could be developed to encourage workers' compensation and long-term disability insurance carriers to emphasize the identification and use of appropriate AT in their return-to-work efforts on behalf of disabled workers.

These efforts could take a variety of forms. Most notably, they could include accelerated tax write-off treatment for sums expended on technology devices and services intended to facilitate the rehabilitation and return to work of ill or injured workers. Additionally, laws governing "second injury funds" could be modified so that employers who cooperate in the use of technology to facilitate return to work will not face increases in their workers' compensation, state unemployment insurance, Federal Unemployment Tax Act, or private disability premiums as a result of subsequent disability of the workers who return to employment as a result of such efforts.

6.8

State Tech Act projects and other entities could continue to work with other entities to establish low-interest loans for the purchase of AT devices.

According to the testimony of Dr. Joey Wallace, who conducted a study entitled A Policy Analysis of Loan Financing Practices: Strategies for the Development of Loan Programs for the Acquisition of Technology, "The outcome of this research was to identify practical approaches and guidelines for consideration in developing responsive loan financing programs for assistive technology. I'm pleased to state that this research has led to the establishment of at least eight assistive technology loan programs nationally, and it continues to be used to modify already existing programs. At the present time, there are at least 20 States with functioning AT loan programs....State Tech Act projects have had a direct influence on the development and operation of a vast majority of these programs. Many reflect a creative public/private partnership." (Dr. Joey Wallace, Virginia Assistive Technology System, Arlington, VA, January 15, 1998) In addition, Tech Act dollars have had a significant impact in providing base funding to initiate these programs.

Encouraging testimony also was received from representatives of other States who testified that default rates on the loans for AT devices were very low, while the number of loans that could be leveraged by individuals with disabilities created a wonderful new pool of resources for individuals with AT (Bill Ouellete, Vice President, Retail Lending, Bank of New Hampshire, Boston, MA, March 25, 1998).

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Appendix B. Training for Customers and Key Personnel: Curriculum, Formats, and Outcomes

TARGET AUDIENCE		
People with disabilities, family members, and guardians		
CURRICULUM	FORMATS	OUTCOMES
1. Advocacy (policy, rights, appeal processes)	1. Individual technical assistance, workshops, self-instructional manuals, peer counseling, and Internet training	1. Ability to obtain assistive technology devices and services; knowledge of appeals process and rights to services and devices
2. Knowledge and awareness of AT devices and services and principles of universal design	2. Preservice and inservice curriculum, workshops, self-instructional manuals, peer counseling, bulletin board, and Internet training and information sources	2. Knowledge of AT service and device resources, knowledge of funding sources; ability to direct assessment process; ability to evaluate device/service effectiveness
3. Training on use of AT low- and high-tech devices and roles of service delivery teams	3. Individual technical assistance, "teletraining" through video conferencing,	3. Provision of service and/or device that meets the needs of the consumer and
4. Assistance with repair, upgrades, and maintenance		
5. Funding acquisition		
6. Individualized education plan (IEP) development		
7. IWRP		

TARGET AUDIENCE		
People with disabilities, family members, and guardians		
CURRICULUM	FORMATS	OUTCOMES
development	<p>AT demo equipment, and loan centers vendor demonstrations</p> <p>4. Individual technical assistance; peer-to-peer networking through telephone, fax, bulletin boards, or the Internet</p> <p>5. Individual technical assistance, self-instructional manuals, workshops, and Internet resources and training</p> <p>6. Individual technical assistance, self-instructional manuals, workshops, conferences, peer-to-peer networks, and Internet resources and training</p> <p>7. Individual technical assistance, self-instructional manuals, workshops, conferences, peer-to-peer networks, and Internet resources and training</p>	<p>significantly reduces technology abandonment; ability to participate fully in AT selection process</p> <p>4. Knowledge of how to ensure long-term effectiveness of device; timely repairs</p> <p>5. Timely acquisition of AT service and/or device; ability to purchase service or device that best meets individual requirements</p> <p>6. Availability of technology to schoolchildren to assist them in obtaining a free and appropriate public education and receiving the benefits of inclusion in the classroom and related school activities</p> <p>7. Technology available to adults in the vocational rehabilitation (VR) system encourages education, training, and job placement activities that lead to competitive</p>

TARGET AUDIENCE		
People with disabilities, family members, and guardians		
CURRICULUM	FORMATS	OUTCOMES
		employment

TARGET AUDIENCE		
Regular education and special education teachers		
CURRICULUM	FORMATS	OUTCOMES
<ol style="list-style-type: none"> 1. Advocacy (policy, rights, appeal processes) 2. Knowledge and awareness of AT devices and services and principles of universal design 3. Training on use of variety of AT low- and high-tech devices 4. Funding acquisition 5. IEP development 6. VR process 	<ol style="list-style-type: none"> 1. Individual technical assistance, workshops, continuing education requirements, self-instructional manuals, Internet training 2. Preservice and inservice curriculum, continuing education requirements, workshops, self-instructional manuals, Internet training and information sources, and state demo labs 3. "Teletraining" through video teleconferencing and vendor demonstrations 4. Self-instructional manuals, workshops, conferences, pre- and inservice curriculum, continuing education requirements, and Internet resources and 	<ol style="list-style-type: none"> 1. Ability to obtain AT devices and services; understanding of students' rights to services and devices 2. Knowledge of AT service and device and personnel resources; knowledge of funding sources; ability to participate fully in ecological assessment process; ability to evaluate device/service effectiveness 3. Ability to assist students with decision making and programming/trouble-shooting; understanding of strategies for inclusion 4. Ability to assist student with timely acquisition of AT services and/or devices 5. Availability of technology to

TARGET AUDIENCE		
Regular education and special education teachers		
CURRICULUM	FORMATS	OUTCOMES
	resources and training 5. Pre- and inservice curriculum, self-instructional manuals, workshops, conferences, and Internet resources and training 6. Pre- and inservice curriculum, workshops, and conferences	schoolchildren to assist them in obtaining a free and appropriate public education and receiving the benefits of inclusion in the classroom and related school activities 6. Ability to assist student in the transition from school to work

TARGET AUDIENCE		
Vocational rehabilitation service personnel		
CURRICULUM	FORMATS	OUTCOMES
1. Advocacy (policy, rights, appeal processes) 2. Knowledge and awareness of AT devices and services and principles of universal design. 3. Training on use of variety of AT low- and high-tech devices 4. Funding acquisition 5. IEP development	1. Individual technical assistance, workshops, continuing education requirements, self-instructional manuals, Internet training 2. Preservice and inservice curriculum, continuing education requirements, workshops, self-instructional manuals, and Internet training and information sources 3. "Teletraining"	1. Ability to obtain AT devices and services; understanding of clients' rights to services and devices 2. Knowledge of AT service, device, and personnel resources; knowledge of funding sources; ability to participate fully in ecological assessment process; ability to evaluate device/service effectiveness 3. Ability to assist clients with decision making

TARGET AUDIENCE		
Vocational rehabilitation service personnel		
CURRICULUM	FORMATS	OUTCOMES
	<p>through video teleconferencing, vendor demonstrations, and state demo labs</p> <p>4. Self-instructional manuals, workshops, conferences, pre- and inservice curriculum, continuing education requirements, and Internet resources and training</p> <p>5. Pre- and inservice curriculum, self-instructional manuals, workshops, conferences, and Internet resources and training</p>	<p>and timely acquisition of AT services and/or devices</p> <p>4. Availability of technology to rehab clients to assist them in finding and maintaining integrated competitive employment of their choice</p> <p>5. Ability to assist students in the transition from school to work</p>

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Appendix C. Listing of Panel Speakers

ARLINGTON, VA JANUARY 15, 1998

Opening Remarks - Katherine D. Seelman, PhD, Director, National Institute on Disability and Rehabilitation Research
Bonnie O'Day, Committee Member, National Council on Disability

Listening Panel - Katherine D. Seelman, PhD, Director, National Institute on Disability and Rehabilitation Research
Thomas F. Hehir, EdD, Director, Office of Special Education Programs
Judith E. Heumann, Assistant Secretary, Office of Special Education and Rehabilitative Services
Howard R. Moses, Deputy Assistant Secretary, Office of Special Education and Rehabilitative Services
Frederic K. Schroeder, PhD, Commissioner, Rehabilitation Services Administration

PANEL I: TECH ACT PROJECTS AND RELATED ORGANIZATIONS
Beth Mineo Mollica, Delaware Assistive Technology Initiative
Jim Geletka, Rehabilitation Engineering and Assistive Technology Society of North America
Curtis Decker, National Association of Protection and Advocacy Systems
Michael Morris, United Cerebral Palsy Associations
Anne-Marie Hughey, National Council on Independent Living

PANEL II: EDUCATION AND LIFELONG LEARNING Nancy Safer, Council for Exceptional Children Mary Binion, ORCLISH, Columbus, OH Susan Garber, Center for Technology in Education, Baltimore, MD Susan Tachau, Parent of child with disability, Pennsylvania Anne Long Morris, American Occupational Therapy Association

PANEL III: UNIVERSAL ACCESS/TELECOMMUNICATIONS Gregg Vanderheiden, TRACE Center Ron Mace, Center for Universal Design Jenifer Simpson, CCD Task Force on Telecommunications and Technology Brenda Battat, Self-Help for Hard of Hearing People, Inc. Nolan Crabb, American Council of the Blind Alan Dinsmore, American Foundation for the Blind

PANEL IV: MANAGED CARE AND THE FINANCING OF ASSISTIVE TECHNOLOGY Peter Thomas, Advisory Commission on Consumer Protection and Quality in the Health Care Industry David Gates, Pennsylvania Health Law Project Edward Eckenhoff, National Rehabilitation Hospital Joan Bradley, Consumer, Delaware Carol Hughes, Parent of child with disability, and 6th District Task Force on Disability

PANEL V: BUSINESS/MARKETING/TECHNOLOGY TRANSFER Tyrone Taylor, Federal Laboratory Consortium Rex Hoover, TriTek Corporation, Virginia Gary Strong, National Science Foundation Joey Wallace, Virginia Assistive Technology System

PANEL VI: EMPLOYMENT George McCoy, North Carolina Vocational Rehabilitation Agency Rich Luecking, TransCen, Maryland John Lancaster, President's Committee on Employment of People with Disabilities Carol Maus, AgrAbility, National Easter Seals Society

PANEL VII: TRENDS, PROJECTIONS, AND SPECIAL POPULATIONS William Mann, Elderly Issues, Center for Assistive Technology, Buffalo Mitchell LaPlante, Demographic Trends, Disability Statistics Program David Yoder, Allied Health Department, University of North Carolina George Zitnay, Brain Injury Association Brian Hartman, Delaware Protection and Advocacy System Warren King, Consumer, Virginia Phillip Beatty, National Rehabilitation Hospital Research Center

REDMOND, WA MARCH 4, 1998

Opening Remarks - Katherine D. Seelman, PhD, Director, National Institute on Disability and Rehabilitation Research

Listening Panel - Katherine D. Seelman, PhD, Director, National Institute on Disability and Rehabilitation Research Thomas J. Hehir, EdD, Director, Office of Special Education Programs Diana J. Koreski, Regional Representative, Rehabilitation Services Administration Frederic K. Schroeder, PhD, Commissioner, Rehabilitation Services Administration

PANEL I: EMPLOYMENT Ela Yazzie-King, Indian Children's Program, Member of Navajo Nation Christopher Gray, Oracle Corporation Collen Long, Safeco Insurance Company Duane French, Alaska Department of Vocational Rehabilitation

PANEL II: ASSISTIVE TECHNOLOGY SERVICE DELIVERY Scott Palm, Student, Shoreline Community College Patricia Dowden, Children's Adaptive Technology Service, Children's Hospital & Medical Center Angela Patterson, ITECH Center, Parents Helping Parents - The Family Resource Center Susan Raymond, Utah Assistive Technology Project Debbie Cook, Washington Assistive Technology Alliance

PANEL III: HEALTH CARE Jodie Haskelkorn, University of Washington, Department of Rehabilitation Medicine Don Sloma, Washington Insurance Commissioner's Office Wendell Matas, Wheelchairs Northwest Michael Kluk, California Protection & Advocacy Matt Knotts, Protection & Advocacy for Assistive Technology Program at the Disability Law Center, Governor's Managed Care Improvement Projects, Management and Implementation Board for the Utah Assistive Technology Program Frances Pennell, Washington Assistive Technology Alliance

PANEL IV: NEW TECHNOLOGY, UNIVERSAL DESIGN, AND TECHNOLOGY TRANSFER Brian Dudgeon, University of Washington, Department of Rehabilitation Medicine, and Doctoral Candidate in Education for the University of Washington Laura Ruby, AT&T Wireless Services Gary Moulton, Accessibility and Disabilities Group, Microsoft Corporation Dave Elliott, Washington Secretary of State Office Phil Christian, USWEB-Seattle Peter Leech, Montana's Technology-Related Assistance Program for People with Disabilities

PANEL V: EDUCATION AND LIFELONG LEARNING John Mick Moore, Special Services Department, Puget Sound Educational Service District Sheryl Bugstahler, Disabilities, Opportunities, Internetworking, and Technology, University of Washington Kurt Johnson, Division of Rehabilitation Counseling, University of Washington, Department of Rehabilitation Medicine, School of Medicine, and Assistive Technology Resource Center

TESTIMONY VIA VIDEOCONFERENCING Catherine Campisi, Disabled Students Programs and Services Unit, California Community Colleges, Chancellor's Office Louise Green, Wyoming New Options in Technology

TESTIMONY VIA VIDEOCONFERENCING from Guam and the Commonwealth of the Northern Mariana Islands Galo P. Tudela, Commonwealth of the Northern Mariana Islands-Medicaid Pedro T. Nakatsukasa, Commonwealth of the Northern Mariana Islands (CNMI) Advisory Board and CNMI Consumer Council Robert Jahier, Robert Jahier Computers

KANSAS CITY, MO MARCH 18, 1998

Opening Remarks - Katherine D. Seelman, PhD, Director, National Institute on Disability and Rehabilitation Research

Listening Panel - Katherine D. Seelman, PhD, Director, National Institute on Disability and Rehabilitation Research Doug Burleigh, PhD, Regional Commissioner, Rehabilitation Services Administration Patty Guard, Deputy Director, Office of Special Education Programs

PANEL I: RURAL/MIDWEST ISSUES Moderator/Introduction - Rachel Wobschall, Minnesota Agriculture/Rural - David Zimmerman, Minnesota Aging/Rural - LaHoma Counts, Iowa Vendor/Rural - Bob Swiney, Oklahoma Consumer - Cheyenne Long Fox, South Dakota

PANEL II: EDUCATION ISSUES Moderator/Introduction - Diane Golden, Missouri David Stockford, Special Education, State Agency, Maine Marnie Campbell, Special Education, Early Childhood, Kansas Johnita & Darell Williams, Parents of older student, Oklahoma Dave Edyburn, Teacher Training, TAM Past President Karen Karns, Special Education, Local Administrator, Missouri Donna Mitchell, Consumer (College Student), Illinois

PANEL III: EMPLOYMENT ISSUES Moderator/Introduction - Willie Gunther, Illinois Frank Lloyd, Vocational Rehabilitation State Agency, Nebraska Leonard Anderson, RERC (Job Accommodations), Kansas John Leslie, Cerebral Palsy Research Foundation, Kansas David Vogel, Consumer/Provider, South Dakota Celestine Willis, Employee/Consumer, Illinois Leonard Rice, Welfare to Work, Arkansas

PANEL IV: HEALTH CARE ISSUES Moderator/Introduction - Marty Exline, Missouri Ganesh Gupta, Pediatric Health Provider, Kansas/Missouri Alan Phillips, Allied Health Provider, Kansas Sue McDonough, Consumer, Illinois Simon Margolis, Assistive Technology Supplier, Minnesota

PANEL V: INDEPENDENT LIVING/ADVOCACY AND OTHER EMERGING ISSUES Moderator/Introduction - Sara Sack, Kansas Brenda Eddy, Telecommunications, Kansas Tom Hlavacek, Wisconsin Coalition for Advocacy Gina McDonald, Independent Living, NCIL President Don Olson, Provider/Vendor, North Dakota

BOSTON, MA MARCH 25, 1998

Opening Remarks - Katherine D. Seelman, PhD, Director, National Institute on Disability and Rehabilitation Research

Listening Panel - Katherine D. Seelman, PhD, Director, National Institute on Disability and Rehabilitation Research Carol Cohen, Program Analyst, National Institute on Disability and Rehabilitation Research Richard Lawrence, Regional Representative, Rehabilitation Services Administration

PANEL I: TECH ACT PROJECTS AND RELATED ORGANIZATIONS Lynne Cleveland, Vermont Technology Project Coordinator Tim Sindelar, Disability Law Center, Massachusetts Protection and Advocacy Anne Maire Marano, Vermont Center for Independent Living Jean L. Minkel, Minkel Consulting, New York

PANEL II: EDUCATION AND LIFELONG LEARNING Joel Mittler, School of Education, Long Island University, Bronxville, NY Jan Nisbet, Institute on Disability/University=BE Affiliated Program, University of New Hampshire David Rose, Center for Applied Special Technology Lee McLean, University-Affiliated Program, University of Connecticut Barbara Keefe, MainePOINT, Governor Baxter School for the Deaf (by phone)

PANEL III: UNIVERSAL ACCESS/TELECOMMUNICATIONS Jerry Berrier, Bell Atlantic Elaine Ostroff, Adaptive Environments Judy Brewer, Web Accessibility Initiative, World Wide Web Consortium Larry Goldberg, National Center for Accessible Media, WGBH Anne Holcomb, York County Parent Awareness, Maine

PANEL IV: BUSINESS/MARKETING/FINANCING Jeff Lavoie, All-Ways Accessible, New Hampshire Mark Lore, Ride-Away Handicap Equipment Bill Ouellete, Retail Lending, Bank of New Hampshire Myron Waldman, Council on Assistive Technology, President of SHHH, Entrepreneur, Rhode Island Steven Tremblay, Alpha One (by phone)

PANEL V: EMPLOYMENT Mark Battista, UNUM William Paul, United Technologies Emer Bartels, Massachusetts Rehabilitation Commission Richard Thompson, Maine-State Purchasing (by phone) Charles Crawford, Massachusetts Commission for the Blind

PANEL VI: TRENDS, PROJECTIONS, SPECIAL POPULATIONS Fred Fay, Justice for All (by phone) Lisah Carpenter, New Hampshire Association of Health Maintenance Organizations James Langevin, Rhode Island Secretary of State Patricia Burnham, Council of Vermont Elders Marylyn Howe, Massachusetts Assistive Technology Partnership Bill Kiernan, Institute for Community Inclusion, Massachusetts

PANEL VII: OPEN COMMENT PERIOD Lou Macintosh, Telecommunications Consultant Vie DiGravio, Massachusetts Easter Seals Angelina Ramirez, Stavros Center for Independent Living Brian Charleson, Carroll Center for the Blind

TALLAHASSEE, FL APRIL 2, 1998

Opening Remarks - Katherine D. Seelman, PhD, Director, National Institute on Disability and Rehabilitation Research

Overview - William Graves, Dean, Mississippi State College of Education and Former NIDRR Director

Listening Panel - Katherine D. Seelman, PhD, Director, National Institute on Disability and Rehabilitation Research Sue Rankin-White, Regional Representative, Rehabilitation Services Administration Curtis Richards, Deputy Assistant Secretary, Office of Special Education and Rehabilitative Services

PANEL I: AGING WITH INDEPENDENCE Moderator - Janet Jendron, South Carolina Larry Polivka, Florida Policy Exchange Center on Aging, University of South Florida, Tampa, FL Wyatt Buckner, Programs Self-Reliance, Tampa, FL Karen Howard, Walton Options for Independent Living, Augusta, GA Janan Smither, Department of Psychology, University of Central Florida, Orlando Hector L. Mendez Fernandez, Puerto Rico Assistive Technology Project, San Juan, PR

PANEL II: TEACHING AND LEARNING IN TOMORROW'S CLASSROOM Christopher Lee, Georgia Tools for Life, Atlanta, GA Debra Bauder, Department of Special Education, University of Kentucky, Louisville, KY

PANEL III: WORKING IN TOMORROW'S WORKPLACE Moderator - Yegin Habteyes, Virgin Islands Vicki Killingsworth, Institute for Disabilities Studies, Hattiesburg, MS Shelley Kaplan, Southeast Disabilities and Business Technical Assistance Center, Atlanta, GA Mark H. Vinzant, Virgin Islands Developmental Disabilities Council Randy A. Dayle, Cogent Systems, Orlando, FL Tony Langton, The Langston Group, Columbia, SC

PANEL IV: ASSISTIVE TECHNOLOGY SYSTEMS OF THE FUTURE Moderator - Julie Nesbit, Louisiana Jody Whitmyer, Whitmyer Biomechanix, Tallahassee, FL Guy L. Leefe, Esquire, Metairie, LA Kirk Garrett, Assistive Technology Corporation, Laurens, SC Bud Rizer, T.K. Martin, Center for Technology and Disability, Mississippi State, MS Jerry Jones, Federal Laboratories Consortium, Eglin AFB, FL Miranda Castro, Puerto Rico Assistive Technology Project, San Juan, PR

PANEL V: RESOLVING FUTURE ASSISTIVE TECHNOLOGY FUNDING PROBLEMS Panel A Moderator - Steve Power, Mississippi John Reiss, Institute for Child Health Policy, Gainesville, FL Theodore Bridges, Alabama STAR Project, Montgomery, AL Sharon F. Griffith, The Able, Trust, Tallahassee, FL Panel B Moderator - Tom Gannaway, Alabama John J. (Jack) Bach, Esquire, Mississippi Protection & Advocacy, Jackson, MS Mike Ballard, National Seating and Mobility, Inc., Chattanooga, TN Jean Isaacs, ATP, Bluegrass Technology Center, Lexington, KY Suzanne Elrod, Texas Assistive Technology Partnership, Austin, TX

PANEL VI: GETTING FROM HERE TO THERE ON TOMORROW'S TRANSPORTATION SYSTEM Moderator - Chase Forrester Becky Plank, National Mobility Equipment Dealers Association, Tampa, FL Mike Jones, Shepherd Spinal Center, Atlanta, GA Joel Volinski, Center for Urban Transportation Research, University of South Florida, Tampa, FL Jeff Douglas, Office of the Dean of Students, Disabled Student Services, Florida State University, Tallahassee, FL

PANEL VII: John Satterwhite, Developmental Disabilities Council, Tampa, FL Carolyn Watkins, Augmentative Communication Specialist, Atlanta, GA Don Grossman, University of Florida, Gainesville, FL Eric Damery, Henter-Joyce, St. Petersburg, FL

OPEN MIKE Doris Mavey Karen Morris Eilene Prasic Diane Johnson Sandra Osborne Olga Green Larry Upright

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Appendix D. Glossary of Terms

Americans with Disabilities Act of 1990 (ADA): Regarded as the landmark civil rights law for people with disabilities, the ADA bars discrimination in employment, governmental programs, and public accommodations. It also mandates the availability of telecommunications relay services.

Augmentative and Alternative Communications (AAC): Augmentative and alternative communication broadly refers to the various techniques for enhancing expressive communication and its comprehension in situations where the routine use of spoken or written language to communicate is limited. AAC devices range from communication boards to computer-based communication devices.

Categorical Programs: Categorical funding programs are those that provide funds for specific purposes. They operate under Federal statutes that are typically very strict about the requirements that States or other recipients must meet.

Developmental Disabilities Assistance and Bill of Rights Act of 1980 as Amended: This is the basic statute setting out the structure and goals of the Federal programs for people with developmental disabilities.

Durable Medical Equipment (DME): DME includes items such as oxygen tents, wheelchairs, and hospital beds. It is defined, most authoritatively under the Medicare statute, as equipment that is expected to last for a substantial period of time, that is subject to repeated use and not consumed by being used, that would not be used or needed by an individual in the absence of a medical need, and that is appropriate for use in the home.

Environmental Controls: These are those devices or systems, usually computer based, that enable individuals with disabilities, mainly persons with high degrees of paralysis, to control their physical environments, including telephones, lights, doors, thermostats, etc.

Independent Living (IL): The independent living movement, now embodied in independent living centers around the country, involves an approach to meeting the needs of people with disabilities that is very different from the traditional categorical services model, which was expert driven. It emphasizes consumer choice in services and providers, peer counseling, and self-advocacy.

Individualized Education Plan (IEP): An IEP is a plan for special education and related services that is developed, usually each year, on behalf of elementary and secondary school students receiving special education services. The IEP sets forth the needs, goals and services that will be addressed in the coming year. Parents as well as educational professionals should be involved in the IEP process.

Individuals with Disabilities Education Act (IDEA): This is the statute, originally adopted in 1975 under the famous PL 94-142 designation, that governs the special education program in this country. It has included assistive technology since 1990.

Instrumental Activities of Daily Living (IADLs): These, together with activities of daily living (ADLs), represent scales of self-care capabilities used by insurers and others to assess an individual's level of functional disability.

Medicaid and Medicare: These are public health insurance programs established in 1965 under the Social Security Act. Medicaid is a means-tested insurance program for people who are poor and have disabilities. Medicare is an insurance program for virtually all persons over the age of 65 and for persons under that age who receive Social Security Disability Insurance. In a number of States, Medicaid is now also available for "buy-in," particularly on behalf of low-income children.

Plan to Achieve Self-Support (PASS): The PASS is a provision of the Supplemental Security Income (SSI) program that allows individuals to develop a plan for using income and resources to purchase assistive technology, take vocational training, or otherwise attain self-supporting status. Ordinarily, people would lose SSI payments if either their income or their resources exceeded specified levels. Approval of a PASS by the Social Security Administration allows these limits to be waived.

Protection and Advocacy (P&A): Each State has a P&A system or agency. These entities provide legal assistance, representation, and other advocacy services to people with developmental and other disabilities. The P&A system participates in the Technology-Related Assistance for Individuals with Disabilities Act program to provide advocacy services in connection with access to assistive technology.

Reasonable Accommodations: Employers who have 15 or more employees are required to make reasonable accommodations =BE in other words, to take reasonable steps to accommodate the disabilities of employees or job applicants. In many cases assistive technology is the only reasonable or most cost effective means of eliminating a barrier to job performance.

Rehabilitation Act of 1973 as Amended: This statute establishes the Federal - State vocational rehabilitation system for people with disabilities and includes key civil rights provisions, such as the famous Sec. 504, that were the forerunners of the ADA. Since 1986, it has included several provisions requiring the inclusion of assistive technology devices and services among the range of available services offered by the vocational rehabilitation system.

Sec. 508: First adopted in 1986, and most recently amended in 1998, Sec. 508 of the Federal Rehabilitation Act requires governmental agencies to ensure the accessibility to and usability by persons with disabilities of a wide variety of communications equipment and other electronic devices purchased for agency use, or in many cases, purchased with Federal funds for use by the public or other entities.

Social Security Disability Insurance (SSDI): This is the insurance program that provides income replacement to workers covered by Social Security who become disabled prior to normal retirement age.

Social Security Trust Fund: Social Security is financed by two trust funds, the Old-Age, Survivors, and Disability Insurance Trust Fund and the Medicare Trust Fund. These funds are derived from revenues from employment and self-employment taxes.

Supplementary Security Income (SSI): SSI is the program of monthly payments to persons with disabilities who meet its standard for low income. Some States augment this amount with additional payments. Income or resources exceeding the limits of the program will result in loss of benefits.

Technology-Related Assistance for Individuals with Disabilities Act (Tech Act): First enacted in 1988, then amended and extended in 1994 for a five-year period, the Tech Act is the first major Federal statute to deal with AT in its own right. The Tech Act created the State technology assistance programs that operate in all 56 States and territories, and it established the national technical assistance programs, including the United Cerebral Palsy Associations' (UCPA) Assistive Technology Funding and Systems Change Project and the Rehabilitation Engineering and Technical Assistance Society of North America's (RESNA) Technical Assistance Project.

Transition Planning: The terms transition planning and transitional services are generic ones, having to do with any service setting in which a person is being moved from one status or one service system to another. In the assistive technology context, the term is used mainly to describe the transition from school to work, or from special education services to vocational rehabilitation services. Both the Individuals with Disabilities Education Act and the Rehabilitation Act contain provisions mandating transition planning and coordination of services.

Universal Design: Products incorporating the principles of universal design are developed with built-in flexibility so they are usable by all people, regardless of age and ability, at no additional cost (Mace, R., et al., *Accessible Environments: Toward Universal Design*, p.156, 1991). While having no official or legal definition, "universal design" is a concept or process having as its goal incorporation into technology and the environment of features that will allow equipment, services and facilities to be utilized by the largest possible range and number of persons, including by persons with disabilities. Examples might include speech output as an optional alternative to visual displays, ramps as an alternative for stairs, and captioning of television and films as an alternative or adjunct to audio output.