Engineers have begun to receive clinical training. The University of Pittsburgh School of

Health and Rehabilitation Sciences provides training in the Center for Assistive Technology and

the University of Pittsburgh School of Law has launched a Disability Law curriculum.

(http://www.shrs.pitt.edu/index2.html; http://www.cat.pitt.edu/;

http://www.law.pitt.edu/about/index.html). A number of universities, including the University of

Pittsburgh, have added a Disability Studies curriculum (http://www.uic.edu/orgs/sds/).   The best

example of education and training within the social model is illustrated below:

Social Model: Example of Best Education and Training Practices, Social Integration

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An example of community integration within the social model is illustrated below:

Japan: Example of Social Integration Attention Shifts to Group Homes for Intellectually Disabled Individuals

Source: Disability World. Issue 29. June-August, 2003.
http://www.disabilityworld.org

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The Integrative Model

The Integrative Model has a broad knowledge base ranging from medicine to literature

which is informed by the experience of people with disabilities. The Integrative Model is "under

construction". From the integrative perspective, individuals with disabilities have many roles,

including citizen and patient, among many others. There are a number of evolving policies and

practices that are representative of this model. Some of them are represented in the World

Health Organization International Classification of Functioning, Disability and Health, the U.S.

Institute of Medicine's *Enabling America: Assessing the Role of Rehabilitation Science and

Engineering*, and the *NIDRR Long-Range Plan* (Brandt & Pope, 1997; National Institute on

Disability and Rehabilitation Research, 1999; World Health Organization, 2001).

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Policies and Practices

While retaining general health, welfare, special education, and employment policies and practices of the first and second stages, countries are in various stages of transition to a civil rights approach and related universality of design applications in systems and markets. International organizations, such as the World Health Organization, have developed a more universal approach to disability. The following interpretation of the ICF illustrates its universality and integrative characteristics (Schneider, 2001):

|	
Universal Model	- *not a minority model*
Integrative Model	- *not merely medical or social*
Interactive Model	- *not linear progressive*
Parity	- *not etiological causality*
Inclusive	- *contextual, environment & person*
Cultural applicability	- *not western concepts* alone
Operational	- *not theory driven alone*
Life span coverage	- *not adult driven (children-elderly)*
Human Functioning	- *not merely disability*

The components of the ICF encourage a broad and integrative classification. The three components of the ICF are body components, activities and participation, and environment. ICF researchers will be challenged to identify the relationships among the components.

The Disability Movement is pressing a number of international organizations for conventions and statements of principle committed to full integration of people with disabilities in society. The UN is being pressed to adopt a convention on the rights of people with disabilities (http://www.dpi.org/en/resources/topics/topics-convention.htm). The World Summit on the Information Society is being pressed to adopt a section on disability within the draft Declaration of Principles (http://www.dpi.org/en/resources/topics/topics-convention.htm). Many of these initiatives have precedent in U.S. law. The Americans with Disabilities of 1990 (ADA) recognizes the full civil rights of people with disabilities (http://usdog.gov/crt/ada/adahom1.htm).

The ADA also provides assistive technology and accessibility of communications with important roles in the realization of rights and opportunities. The United States has regulated the communications industry to assure access. The original Communications Act of 1934 recognized universal access for all people in the United States. In 1996, the new Telecommunications Act was amended to include rules requiring telecommunications manufacturers and service providers to make their products and services accessible to people with disabilities, if readily achievable (http://www.access-board.gov/telecomm/html/telfinal.htm). The United States has also created market incentives to motivate industry to make its systems and products accessible (http://www.section508.gov/). As Section 508 of the Rehabilitation Act requires, the United States government constitutes a large market for accessible technology and employs the federal procurement system to purchase it (http://www.ittatc.org/laws/255.cfm). Section 508 requires access to electronic and information technology provided by the Federal government. The law applies to all federal agencies when they develop, procure, maintain or use electronic and information technology. Federal agencies must ensure that technology is accessible to employees and members of the public with disabilities to the extent it does not impose an "undue burden". Section 508 speaks to various means for disseminating information, including computers, software and electronic office equipment. It applies to, but is not solely focused on federal pages on the Internet or the World Wide Web. It does not yet apply to web pages of private industry.

Applications of technology within the integrative model appear below. The first example

is a mammogram at Magee Women's Hospital in Pittsburgh made accessible for patients with

disabilities:

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

Magee continued

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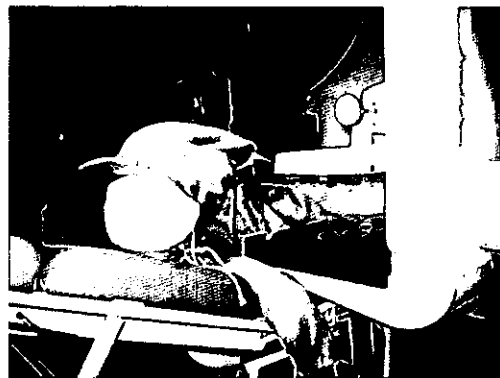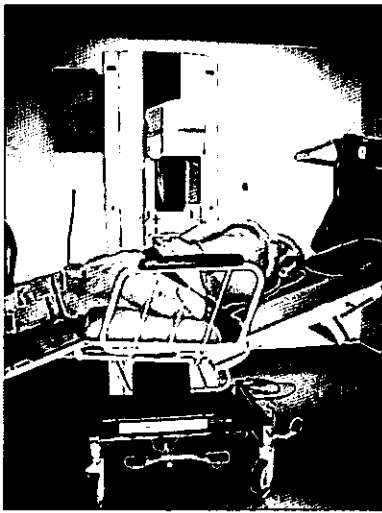
Other examples show President Clinton viewing an accessible voting kiosk and the CEO of Microsoft viewing accessible equipment:

Research Applications: President Clinton Viewing Accessible Voting Machine at the White House 1999

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Research Applications: the Marketplace and

Microsoft President and CEO

"Microsoft applauds the government's efforts to lead the way in requiring accessible technology to be the standard and not the exception"
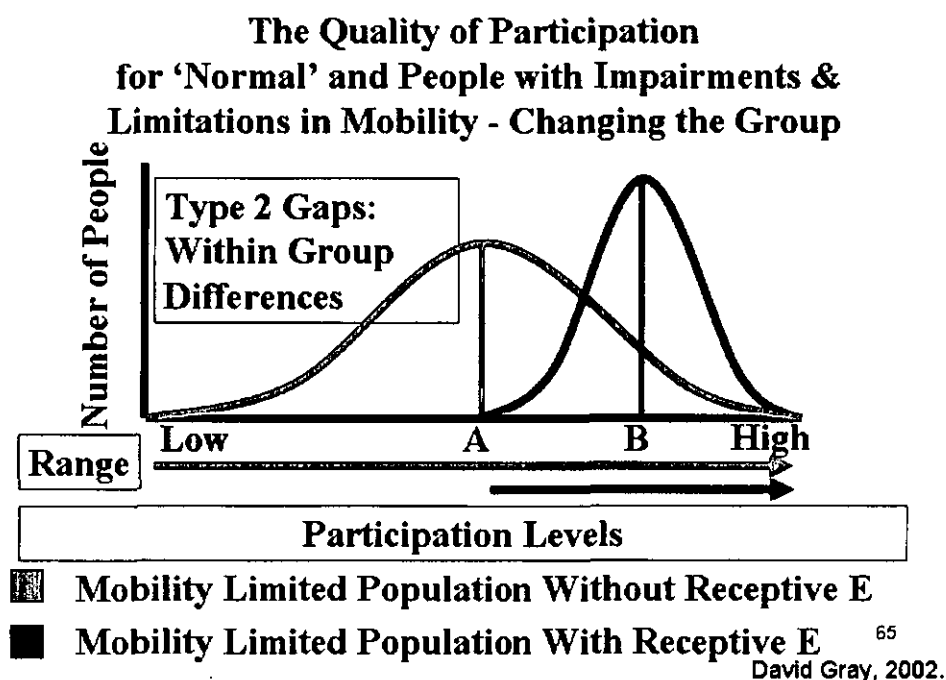

http://www.quadmedia.com/p41800pressrelease.htm   67

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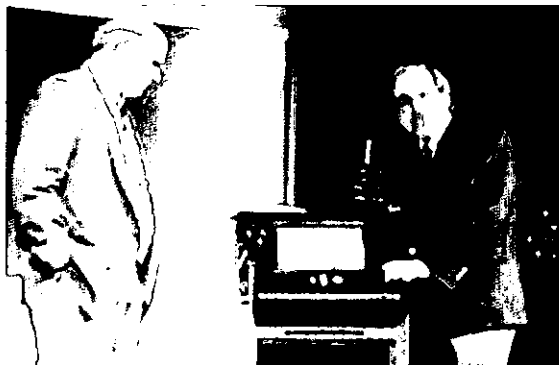
Measurement Tools and Principles

Disability is not inherent in measurement tools designed with the integrative model in mind. Psychological, social and environmental factors must be incorporated into assessments that are based on an integrative model. Assessment measures that are consistent with the integrative model assume a real world context of school, family, employment. Health service performance measures should be based on consumer outcomes. Some measures of disability may be disability specific in which case they may change the perception of the capability of the individual. David Gray illustrates this point below (grayda@msnotes.wustl.edu):

The Quality of Participation
for 'Normal' and People with Impairments &
Limitations in Mobility - Changing the Group

Type 2 Gaps: Within Group Differences

Number of People

Range

Low   A   B   High

Participation Levels

▦ Mobility Limited Population Without Receptive E

■ Mobility Limited Population With Receptive E [65]

David Gray, 2002.

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Researchers at the RERC at the University of Buffalo (http://www.ap.buffalo.edu) have developed a prototype database on anthropometry of wheelchair users.

Research Example : Special Measures

Anthropometrics

> Overview

- Development of a prototype database on anthropometry of wheelchair users

- 2 Problems
    - Little information available
    - Information not readily usable
    - Different methods used in all existing studies

- Developing standardized approaches, collection of data, presentation of data for a large sample of wheelchair users

Anthropometric Database Project

RERC on UD at Buffalo | Major Projects

Researchers at the Department of Rehabilitation Sciences and Technology, School of Health and Rehabilitation Sciences have developed a Virtual Reality Tele-Rehabilitation System for Analyzing the Accessibility of the Physical Environment.
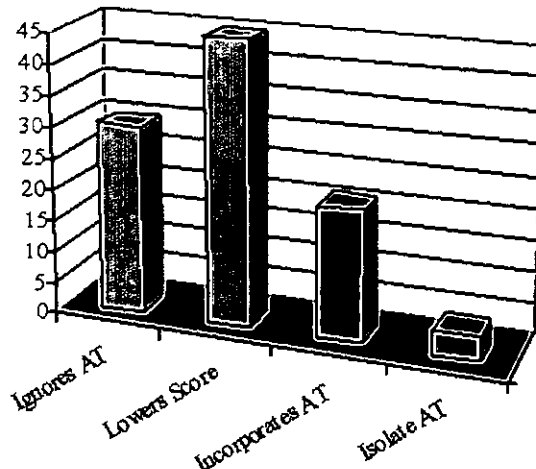
3. 3D modeling (continued)

- <u>To make 3D models of physical environments of the wheelchair user's home from 2D photos</u>.

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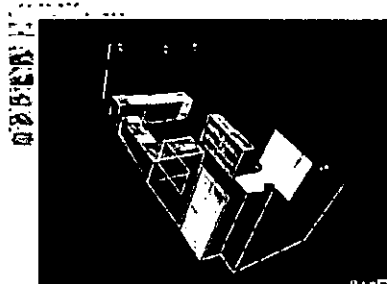
The slide below shows the need for research in outcomes for assistive technology.

Applied Research Example of Future Research on Outcomes

Field Scan 2 – Treatment of AT in Current/Emerging
Health & Rehabilitation Outcome Measures

- It is overwhelmingly clear that existing health and rehabilitation outcomes measures fail to address AT.

- While 70% consider AT, only 4 provide a method for isolating AT.

ATOMs: Outcomes for Product Developers, 2003 Center for
Rehabilitation Sciences & Technology

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Education and Training

The ICF has become a useful framework on which to base coursework for individuals across a wide number of fields, including the health professions, social work, psychology, and Disability Studies. Over thirty ICF-related courses have been identified in universities in the United States and Canada (icf_clearinghouse@listserv.cdc.gov). For example, the University of Pittsburgh Department of Occupational Therapy has adopted the ICF as the foundation for curriculum design.

CONCLUSIONS, OPPORTUNITIES AND CHALLENGES

In the international area, the following policy, research and practice opportunities and challenges exist:

- Monitor UN Implementation of the Standard Rules and enact a UN Disability Human Rights Convention

- Incorporate a statement on accessibility for people with disabilities into the World Summit on the Information Society draft principles

- Support developing countries in provision of programs and participation for people with disabilities

- Develop the ICF measures for social and environmental factors so that assessment measures assume a real world context of school, family, employment

- Base health service performance on consumer outcomes

- Generate global marketplace incentives and standards to support universal design, usability and accessibility in product design and sale

- Add disability to surveys of health, income, employment and education

In addition to the above the domestic area provides the following opportunities and challenges:

- Commit public and private research and development funding to technological inclusion of people with disabilities

- Promote technological inclusion by linking technology policy to civil rights

- Monitor research policies to protect people with disabilities in research conducted abroad with domestic research funding

- Create a government marketplace for usable and accessible systems and products

- In the practice area, the following opportunities and challenges exist:

- Promote science, technology and education and training opportunities for people with disabilities

- Integrate the perspective of people with disabilities and social and environmental factors into curricula

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- Broaden the range of disciplines that address disability to include engineers, designers, lawyers

- Adopt the ICF as a framework to develop health-related professional education

  In research, the following opportunities and challenges exist:

- Develop measures of social factors and environmental domains

- Develop accessible survey research process and questions about social behavior and environmental accessibility

- Develop evidence-based practice

- Develop assistive technology outcome measures

Opportunities for collaboration exist:

- Develop strategies based on the Tokushima Agreement between Japan, the United States, Australia and Europe

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9. The Information Age: Participation Challenges and Policy Strategies

to Include People with Disabilities

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INTRODUCTION AND BACKGROUND

Participation in the "Information Age" by people with disabilities is a policy

challenge for countries, businesses, and international organizations. Policies that involve

special or "assistive" technology, such as wheelchairs and hearing aids for people with

disabilities, are important. However, domestic policies for special technology may not be

sufficient to bring about accessible information and communications technology in

domestic and global marketplaces. For example, policies for special assistive technology

may not include research and development strategies that target mainstream public and

private sector research and development agencies. Additional policies may be necessary

to motivate research institutes and industries to develop and commercialize accessible

information and communications technologies (Seelman, 1997, 1999, 2000a, 2000b).

The purpose of this discussion is to explore science and technology policy in

order to identify strategies that motivate the private and public sectors to develop

accessible information and communications technologies. These strategies may include

existing examples of international and domestic technology policies of international

organizations (especially those related to the United Nations) and countries around the

world. In particular, the United States during the Clinton Administration (1993-2001),

will serve as a country focus. At that time, the United States adopted a number of policy

and research measures to bridge "the Digital Divide" for people with disabilities. These

policies and research initiatives form the basis for present and future collaborative

opportunities.

UNITED NATIONS

The United Nations system provides a number of important "policy and legal building blocks" which facilitate further participation of people with disabilities in the Information Age. These laws and policies include the Universal Declaration of Human Rights (UDHR) of 1948, which is the basis for subsequent international conventions, as well as other documents that illuminate the right to participate in the Information Age. The UDHR, like the Constitutions of Japan and the United States, was developed before the full emergence of awareness of the relationship between human rights and technology. Later laws and documents build on the rights incorporated in these basic laws to support accessibility so that human rights can be realized. Rule 5 of the Standard Rules on the Equalization of Opportunities adopted by the UN General Assembly in 1993 identifies accessibility in the built environment and access to information and communication as crucial to equal opportunity (http://www.un.org/esa/socdev/enable/dissrec04.htm). Technology's relationship to function is also included in the World Health Organization's International Classification of Functioning, Disability and Health (ICF), adopted in 2001. The ICF identifies the concepts of participation and the environment as basic components of the classification for all human beings and gives assistive technology an important role in assessment (http://www.who.int/gb/EB_WHA/PDF/WHA54/ea5418.pdf). The relationship between technology and equal opportunity is also being recognized in the ongoing process for a UN Convention on Promotion and Protection of the Rights and Dignity of Persons with Disabilities
(http://www.un.org/esa/socdev/enable/rights/adhoccom.htm;
www.dpi.org/en/resources/topics/topics-convention.htm). The human rights and civil

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rights tradition strongly inform the Americans with Disabilities Act (ADA) of 1990. The ADA may be the first civil rights legislation to include policy strategies for special technology as well as strategies for mainstream communications technology. The ADA is internationally recognized for these and other innovations.

Recently, UN Secretary General Kofi Annan has urged business leaders to play an active role in bridging the global digital divide (http://www.digitaldividenetwork.org/content/sections/index.cfm; http://www.unites.org). The World Summit on the Information Society's (WSIS) ongoing process to draft a Declaration of Principles provides an opportunity to add a human rights and technology perspective of the Information Age for people with disabilities and others who are on the information-poor side of the digital divide. (http://www.itu.int/wsis; http://www.geneva2003.org) Adoption of a proposed section on accessibility for people with disabilities by WSIS will, in part, depend on countries communicating with members of their delegations.

INTERNATIONAL ORGANIZATIONS

In addition to United Nations, there are a number of other consumer and technical international organizations that may be involved in disability technology policy leading to full participation in the Information Age. In 2000, four rehabilitation engineering associations formed an agreement, the Tokushima Agreement, to collaborate in order to benefit assistive technology development (http://www.resna.org/AboutRESNA/Tokushima/Tokushima.html).
While long-term and ongoing efforts exist in the development of international standards for wheelchair-related assistive technology, parallel efforts in information and computer

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technology are not as evident

(http://www.wheelchairstandards.pitt.edu/WCS_S/WCS_S_RESNA/WCS_S_RESNA_S

eat/WCS_S_RESNA_Seat_pdf/WCS_S_RESNA_Seat_RefDoc_pdf/WCS_S_RESNA_H

ist.html). Information and communications technologies may involve different

international organizations may be involved in than wheelchair development. For

example, the RERC on Wireless Technology at the Georgia Institute of Technology is

involved in an Alternative Interface Access Protocol Standard working with international

groups such as the Internet Engineering Task Force

(http://www.wirelessrerc.org/news/archive.html). Consumer groups may also maintain a

keen interest in accessibility. Consumer organizations, such as Disabled People

International (DPI)--a grassroots, cross-disability network with member organizations in

over 110 countries--are actively involved in technology issues (www.dpi.org/).

## COUNTRY-BASED EXAMPLES OF INFORMATION POLICY: THE UNITED STATES

Do law and policy in the United States support participation of people with

disabilities in the Information Society? Sometimes, yes--sometimes, no. The United

States has adopted both general law and special law addressing technology and

accessibility. Technology for people with disabilities has been incorporated into benefits,

services, civil rights and accessibility policies.

Civil Rights and Regulations of Technology

The U.S. Constitution of 1788 was not written during a historical period when

access to technology was necessary for the expression of civil rights. The Americans

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with Disabilities Act (ADA) of 1990, building on the tradition of civil rights in the U.S. Constitution, places technology in a central role in the pursuit of equal opportunity in the public and private sectors (http://www.usdoj.gov/crt/ada/pubs/ada.txt). The ADA's requirements for reasonable accommodation through technology are dynamic and sensitive to advancements in technology (West, 1991). The ADA requires certain technologies to be accessible. In particular, the ADA requires telecommunications relay systems for persons who are deaf or hard of hearing to be accessible. The schematic below shows a modern telecommunications relay system. The private sector has competed for contracts to develop and manage these relay services. The CapTel System shown below is now in the testing stage (http://www.ultratec.com/infoCapTel.html). This system can be used by people with some degree of hearing loss because it works like a telephone but also displays every word the caller says during the conversation.

Telephone Relay Service for People Who Are Deaf and Hard of Hearing

http://www.ultratec.com/info/CapTel.html
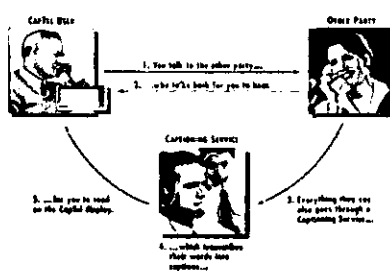
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The Relay System requirements of the ADA have precedent in U.S. Communications law. In 1934, the U.S. adopted the Communications Act as its basic communications law. The

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Communications Act provided for wire and radio communication for all as indicated by the following excerpt:

> For purposes of regulating interstate and foreign commerce in communication by wire and radio so as to make available...to all the people in the United State...rapid, efficient, nation-wide and world-wide wire and radio communications services...
> (http://www.fcc.gov/Reports/1934new.pdf)

The Communications Act precedent for making the Information Society available to all was evident in the 1996 amendments referred to as the Telecommunications Act. The new Act addressed the needs of people with disabilities in Section 255. Section 255 ruled that telecommunications manufacturers and service providers must make their products and services accessible to people with disabilities, if readily achievable. Issues are emerging. For wireless technology, there are many communications possibilities, such as text messaging and other capabilities that are part of the network. How will they be regulated? How will standards be promoted and what are the mechanisms for creating transitions so that lags do not occur?

(http://www.wirelessrerc.org/news/policy_review.html;

http://www.wirelessrerc.org/news/10 key_issues.htm)

Market Incentives

The ADA is a civil rights approach to technology. Section 255 of the Telecommunications Act is a regulatory approach to technology. Both are strengthened by an approach that provides incentives to the information and communications industry. Section 508 of the Rehabilitation Act of 1973 provides for such incentives (http://www.section 508.gov/). Section 508 requires access to electronic and information technology provided by the Federal government. The law applies to all federal agencies

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