

*DRTC – ICT Conference on  
Digital Learning Environment  
11<sup>th</sup> –13<sup>th</sup> January 2006  
DRTC, Bangalore*

**Paper: R**

## **ICT Support for Disabled Persons**

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### **Abstract**

*New hopes are streaming with the advent of Information Communication Technology (ICT). Apart from its increasing importance in bringing the hemispheres close ICT has paved the way for the challenged people—physically or mentally—to ameliorate their life by providing appropriate educational environment and equipments suitable for them. But to avail facilities as much as possible through this booming technology international cooperation for copious provisions in respect to ICT, issues in standards and legislations at various levels, universal access to ICT and its challenges and the principles involved in creating standard technological products etc are to be taken care of. This article aims at capturing some of those provisions the exploitation of which can be optimized through organizational and governmental enterprise to help out the challenged people more and more.*

## **1. Introduction**

The emergence of ICT enkindles the hope for those who have so long been deprived for the challenges with which life has overburdened them—visual impairment, physical disability, etc. More importantly, disability is being recognized as “a social construct created by ability-oriented and ability-dominated environments.” According to this model “even though impairment has an objective reality that is attached to the body or mind, disability has more to do with society's failure to account for the needs of persons with disabilities” (8).

Here it is tried to capture the various enterprises at different levels from international to national, governments to private organizations, like WHO, UN and European and American Governments, to provide the challenged people the facilities a normal human being enjoys.

## **2. Issues & Challenges**

The major advances in ICT usage - as well as the major new barriers imposed by ICT on disabled people - are predicted on the issue of accessibility. ICT determines accessibility in the sense that the user of the technology has to adapt to a norm, which is set through the design and operation of the technology.

The discrepancy between standards and ICT developments can best be illustrated by reference to standards for the World Wide Web. The lack of an overarching regulatory framework has resulted in the daily emergence of websites that do not conform to any rules of legibility, clarity or order.

From a totally different perspective it can be said that some of the barriers are the result of a narrow mindset amongst decision-makers. If one forgets 'the blind' and focus on the vast number of people who have some kind of problem with print, then there would be a huge market for symbol and image magnification within standard computer applications software. As a general rule the number of people who can be helped by a standards-conforming package go far beyond those who are officially designated as

'disabled'. Similarly, the largest segment requiring image-free Internet access is not visually impaired users but those who want to use mobile phones in poor light or who use such phones with small screens. In practice, these examples are the essence of what design-for-all is about.

### **3. Standards and Legislation**

Many countries have adopted inclusive policies and enforced them with standards and legislation. While most of these are largely found in high-income countries, the general principles are applicable in any context where ICTs are used.

The scope of possible specific legislative initiatives in this area could include:

- Accessibility of public information and services based on ICTs
- Accessibility obligations on the private sector in relation to ICTs
- Availability of assistive technology for those who need it in order to make use of the above

The basis for such legislation could be to ensure equality of opportunities for the mobility of all citizens and workers, including those who are disabled. (8)

## **4. Design-For-All (DFA) & ICT**

### ***4.1 The Role of DFA***

There are two main means of ensuring that people with disabilities benefit from ICT. The first of these is based on the principle of *Universal Design* (American) or *Design for All* (European). This principle lays down generic guidelines for designing mainstream products and services which will accommodate a 'broader average' of users including many of those with disabilities or older people.

However, designing for the broader average will not always accommodate the needs of those with severe disabilities or very particular user requirements. Access to technologies for such users can best be achieved by

the second means - designing special products and services or in many cases adapting, or interfacing, existing products or technologies to meet the user's specific requirements. The technology based on universal design and on special products and services for older people and people with disabilities is called 'assistive technology' (AT). (12)

#### ***4.2 Principles of Universal Design***

- **Equitable Use:** The design is useful and marketable to people with diverse abilities.
- **Flexibility in Use:** The design accommodates a wide range of individual preferences and abilities.
- **Simple and Intuitive Use:** Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.
- **Perceptible Information:** The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.
- **Tolerance of Error:** The design minimizes hazards and the adverse consequences of accidental or unintended actions.
- **Low Physical Effort:** The design can be used efficiently and comfortably and with a minimum of fatigue.
- **Size and Space for Approach and Use:** Appropriate size and space are provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility. (3)

#### ***4.3 Adaptive and Assistive Technologies***

Any technology that allows access to computer resources for a person with disabilities is known as adaptive technology. But the challenge remains to make adaptive technology part of any base configuration and make all components work in a seamless fashion. This will increase the access to computers and applications without making major modifications and enable the disabled to use computers. As a result, disabled persons can also participate in the Internet

## **Examples of Adaptations and Assistive Devices**

### ***Visual Impairments***

#### ***Low Vision***

Glare protection screens, large monitors with high resolution, Magnified displays of computer screens, Magnified displays of hardcopy materials, large print production, Color and contrast selection, Keyboard orientation aids.

#### ***Blindness***

Speech synthesizers, Screen reader software, Braille printers, Braille translation software, Braille displays, Braille note-takers, Braille input devices, Optical character recognition (OCR), and Speech recognition.

#### ***Hearing Impairments***

Visual redundancy on computers, Interpreters, Hearing aid compatible phones, Speech amplification telephone, Speech amplification meeting or conversation, Text telephony, Text telephone relay services, Signaling systems, Electronic mail and fax, Videoconferencing.

#### ***Mobility Impairments***

Sequential keystroke input, Key repeat rate control, Keyboard macros, Alternative keyboards, Non-keyboard dependent input devices, Word prediction software, Speech recognition, Robotic devices, Mouse alternatives, Key guard, Speaker phone, Gooseneck receiver holder, Phone headset, Speed dialing.

There are several databases and information services to help in obtaining the appropriate solutions. The CITA (Committee for Information Technology Assessment) Handbook is a good example of such services and gives a good example of various products available. (8)

### ***4.4 Universal access***

The prerequisites for universal access have been distilled into the 6As by the \*PROMISE project: Availability, Awareness, Accessibility, Affordability, Appropriateness (usefulness) and Acceptability:

**Availability**

Wide availability of equipment and on-line services is a fundamental prerequisite. Initiatives must therefore define ways of ensuring that individuals have access to the equipment and connections that they need, and that service providers are encouraged to provide useful and desirable services.

**Awareness**

One major barrier to inclusive approaches is the lack of awareness in public policy, in industry and in other sectors such as education, about the needs of disabled people and older people and of the ways in which these needs can be catered for. Potential users must also be aware of what is possible and be interested in taking up the opportunities.

**Accessibility**

Given the various disabilities initiatives must give the highest priority to the promotion and implementation of "design for all", to ensure that everyone can have access.

**Affordability**

Because disabled people often have low incomes and many older people are still at risk of poverty, public financial support is an important factor. Initiatives must therefore actively address the financial dimension and ensure that lack of income does not exclude the participation of those who could benefit the most.

**Appropriateness**

It is important to assess the appropriateness (usefulness) of the various applications in particular circumstances. One of the main ways to do this is through involvement of end-users. Initiatives must therefore include social assessment as a central dimension.

**Acceptability**

Finally, a key ingredient of usage is whether the user accepts the product for what it is. (5)

## 5. Universal Service Obligations

UNIVERSAL DIMENSIONS TO BE REACHED	UNIVERSAL SERVICE GOALS
Universal availability	<ul style="list-style-type: none"> <li>• Full range of identical services available irrespective of location</li> <li>• Universal provision of payphones</li> </ul>
Universal accessibility	<ul style="list-style-type: none"> <li>• Provision of equipment to ensure functionality for all users</li> <li>• Non-discriminatory access to all facilities</li> </ul>
Universal affordability	<ul style="list-style-type: none"> <li>• Removal as far as possible of all financial barriers to telecommunications access and usage</li> <li>• Efforts to redress socio-economic inequality by explicit targeted programs</li> </ul>
Universal technological standard	<ul style="list-style-type: none"> <li>• Policies concerning the spread of communications technologies such that certain innovations are made universal on the basis of need, social expectations and social desirability</li> <li>• Uniform quality of service for all users</li> <li>• Periodic upgrading of the standard telecommunication service</li> </ul>
Universal telecommunications and participation in society	<ul style="list-style-type: none"> <li>• Policies of telecommunications use which enable full participation in society</li> <li>• Protecting freedom of speech and freedom of information through policies of common carriage and content-neutrality</li> <li>• Protecting privacy</li> </ul>

Source: Gerard Goggin and Ian Wilson, "Reforming Universal Services: The Future of Consumer Access and Equity in Australian Telecommunications," Consumers Telecommunications Network, Sydney, Australia (1993). (11)

## 6. Some initiatives

### ***National level***

#### **The J.S.S. Polytechnic for Physically Handicapped, Mysore**

This polytechnic institution was established by the J.S.S. Mahavidyapeetha, a nongovernmental education society that supports 220 educational institutions in India. With financial aid from the government of Karnataka, the polytechnic institution is linked to a network of institutions, one of which is the Science and Technology Entrepreneurs Park located on the same campus. Through this organization, students with physical disabilities will be assisted to start small businesses. Other established organizations in the city of Mysore that work with the rehabilitation of persons with disabilities include.

#### **Dr. Ambedkar Institute for Physically Handicapped, Kanpur**

This institute, established by the government of Uttar Pradesh, is located in Kanpur, in Northern India. It has links with major organizations in the region, including the Indian Institute of Technology, Kanpur.

#### **The Simputer Project**

In an effort to bring the Internet to the masses in India and other developing countries, in line with Design-for-all several academics and engineers have used their spare time to design an inexpensive handheld Internet appliance. The Simputer, for SIMple ComPUTER, makes the Internet accessible to illiterate populations. The device was designed by professors and students at the Indian Institute of Science (IISc) at Bangalore and engineers from Encore Software, a Bangalore-based design company. (8)

### ***International Initiatives***

As part of its “e-Europe” initiative, the Commission of the European Union has recommended all European institutions and member states to endorse the existing WAI guidelines, thereby making the design and content of all public Web sites accessible to people with disabilities.(10)

The PROMISE project was established to raise awareness about the ways in which technology can benefit the disabled and the elderly. The project collected case studies and analyzed best practices in the disability area. Although PROMISE looked at the problems and solutions in the European



context, several guidelines and practical solutions can be applied to developing countries if they are adapted to local circumstances and prerequisites. (4)

The Web Accessibility Initiative or WAI of the W3c seeks to make web pages available and usable by the largest audience possible. The World Wide Web Consortium's (W3C) commitment to lead the Web to its full potential includes promoting a high degree of usability for people with disabilities. WAI, in coordination with organizations around the world, pursues accessibility of the Web through five primary areas of work: technology, guidelines, tools, education and outreach, and research and development. (6)

## **7. Conclusion**

Standardization, legislation and regulation in ICT are the key to effective propagation of the design-for-all principles to benefit the maximum number of people. However, while the global market for accessible products is significant and growing, the industry has not yet seen the market opportunities for accessible ICT products and services. In general, the ICT industry is poorly informed about the requirements of disabled and older users.

In DFA terms, considerations should be given as to how a person with a physical or sensory activity limitation interacts with the whole system at the service level. Standards should not only maximize interoperability and navigation for all users but also develop secure feedback. But this is not feasible without requisite standards, which can play a significant role by providing guidance and offering a clear framework for ICT developers who wish to make their products and services maximally accessible.

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