

TECHNOLOGICAL INITIATIVES FOR PEOPLE WITH DISABILITIES

Meenakshi Vatsa¹ Prof. Anupam Verma²
Architect, Cubatic Design, New Delhi¹, Asst. Prof., CED, KNIT, Sultanpur²
E-Mail : vatsa.arch@gmail.com

ABSTRACT- Technology has become an integral part of today's society. It touches nearly every aspect of our daily life. We are making our life more convenient and easy by using different form of it but for years, disabled people had to rely on somebody else doing things for them. This article focuses on different aspects of measures we should take for the benefits of disabled. And since they are less likely to be in work due to their disability, their poverty rate is about twice as high from other people. But now with the help of assistive technology, disabled people can do things that would have never been possible before. And technologies that could help disabled people contribute more at workplace are higher in demand than ever. This article discusses how we are considering the need to serve disabled people more seriously in every way. There are various types of disability and different types of models as how our society perceives it. And for every type of disability there are different ways to communicate effectively. So here we discuss how we can consider the special requirements for planning of public buildings meant for use of physically challenged. Findings from several studies are also briefly reviewed here. The purpose of this article is to document different aspect of disability and the method we can adopt to make their life easy.

1. INTRODUCTION

Technology is at the core of most aspects of inclusive development and the fulfilment of rights for people with disability. Without technology the basic rights such as right to education, employment and involvement in every social, political and cultural aspect of society is very difficult. Often, in developing countries technological developments are so expensive that they rarely include the criteria for disables while planning.

Policy-makers and the market need to ensure that existing and new technologies are made accessible to those groups who are often excluded from the benefits of mainstream technological developments, particularly people with disability.

The current attitude needs to change in approaches to technology innovations. Where the benefits of technology are only occasionally given

to the people with disability as a by-product of mainstream developments.

Accessible technology is also crucial in emergency and disaster situations. The data which is available to us directly points out the fact that people with disabilities are one of the most vulnerable groups at the time of disaster. A lack of awareness, inclusive and responsive policy frameworks, a lack of strategy for risk reduction and also inaccessible information, communication, facilities and services all contribute to the current scenario.

2. OVERVIEW

- a) In the UK, almost half of disabled people do not access the internet regularly.
- b) Reasons that disabled people are not online include social exclusion, accessibility issues, costs, motivation and lack of support.
- c) When disabled people are not in education or employment there is a gap in funding for ICT equipment.
- d) Many websites and devices are inaccessible to many disabled users.
- e) Despite a legal duty on service providers to make reasonable adjustments for disabled people, no cases involving ICT have yet been brought to court.
- f) Mobile technologies, and in particular the rise of 'apps', are reducing the costs of many assistive technologies.
- g) Voice recognition software is increasingly providing benefits for many disabled users

3. DISABILITY & ASSISTIVE TECHNOLOGY

Disability is multi-dimensional, complex, effective and contested. For most people, technology makes things easier but for people with disabilities technology makes things possible and accessible. Access to assistive technology to the children with disabilities is crucial to get the benefits of education system with the help of personal assistance, sign language interpreters etc. it is a precondition to achieve equal opportunities and enjoying human rights.

Assistive products are also known as assistive devices. The International Classification of Functioning, Disability and Health (ICF) defines assistive products and technology as any product, instrument, equipment or technology adapted or specially designed for improving the functioning of a person with disabilities.

4. TYPES OF DISABILITIES

A) NON-AMBULATORY DISABILITIES

Impairments which regardless of cause Or manifestation, for all practical Purposes confine individuals to Wheelchairs.

B) SEMI-AMBULATORY DISABILITIES

Impairments that cause individuals to walk with difficulty or insecurity. Individuals using braces or crutches, amputees, arthritis, spastics and those with pulmonary and cardiac ills may be semi-ambulatory.

C) SIGHT DISABILITIES

Total blindness or impairments affecting sight to the extent that the individual functioning in public areas is insecure or exposed to danger.

D) HEARING DISABILITIES

Deafness or hearing handicaps that might make an individual insecure in public areas because he is unable to communicate or hear warning signals.

E) DISABILITIES OF CO-ORDINATION

Faulty co-ordination or palsy from brain spinal or peripheral nerve injury.

F) PEOPLE WITH ALLERGIES

People with allergies may be sensitive to dust, mildew, pollen, animal hair, formalin, turpentine, etc. Some are sensitive to contact

with substances and materials, such as, nickel, chromium and rubber.

G) PEOPLE WITH HEART AND LUNG DISEASES

People with heart and lung diseases may only be able to walk short distances and may be unable to climb stairs. The requirements of these people are similar to those with impaired mobility.

H) PEOPLE WITH EPILEPSY, HEMOPHILIA ETC.

The requirements of those with epilepsy, hemophilia etc, are related primarily to the design of buildings and the need to minimize the risk of injury caused by falling or encountering obstacles.

5. TYPES OF ASSISTIVE PRODUCTS

Some of the examples for assistive products and devices are Mobility walking stick crutch, walking frame, manual and powered wheelchair, tricycle artificial leg or hand, leg or hand splint, clubfoot brace corner chair, supportive seat, standing frame, adapted cutlery and cooking utensils, dressing stick, shower seat, toilet seat, toilet frame, feeding robot, vision eyeglasses, magnifying software for computers, GPS based navigation device, Braille systems for reading and writing, screen reader for computer, talking book player, audio recorder, balls that emit sound, hearing headphones, hearing aid amplified telephones, hearing loop, communication cards with texts, communication board with letters, symbols or pictures and electronic communication device with recorded or synthetic speech.

6. COMMUNICATING WITH PEOPLE WITH DISABILITIES

A) HOW TO COMMUNICATE WITH A BLIND/PARTIALLY SIGHTED PERSON

- You only need to take care of few simple things while talking to a blind or visually impaired person. It may be helpful to ensure that they know you are there and to introduce

yourself so that they know who they are speaking to.

B) HOW TO COMMUNICATE WITH A DEAF/HARD OF HEARING PERSON

- Do not adopt the approach, ‘If in doubt, SHOUT!’
- You may need to get the attention of the person by touching them gently on the arm, and then speak normally, but make sure that your mouth is not covered in any way and ensure that you face the person to whom you are speaking.
- If you are speaking to a deaf person in a group try to ensure that only one person at a time speaks so that he/she can more easily follow the thread of the conversation.
- If the person you are speaking to uses a BSL interpreter it is very important to make sure you speak directly to the deaf person and not to the interpreter.

C) HOW TO COMMUNICATE WITH A WHEELCHAIR USER

- Wheelchair users will be either full-time or part-time wheelchair users.
- Never approach the wheelchair user from behind and either slap your hands in greeting on their shoulders and/or shout their name in greeting when they cannot see you.
- Don’t use the wheelchair user’s wheelchair as apparatus or furniture, by either standing on the back of the wheelchair or on any other parts.
- Don’t invade a wheelchair user’s privacy. It is surprising how many people feel that it is acceptable to lean over the wheelchair in such a way that it invades the owner’s private space.
- In an attempt to get down to the wheelchair user’s level, don’t stretch your arms along the wheelchair arms in such a way that you end up ‘eye balling’ the wheelchair user! It is extremely disconcerting.
- If you want to offer any assistance or help to a wheelchair user, please remember to ask them first! Whilst this may seem obvious –

it isn’t to a lot of people. Unfortunately the story isn’t apocryphal about the person who saw the wheelchair user pushing themselves along the road near to a crossing. Without asking, they grabbed the wheelchair from behind, pushed it across the main road and ran off smiling at their good deed for the day, leaving the wheelchair user and their young son separated by the road.

Here are some words that are largely disliked by disabled people, along with a more acceptable option or phrase.

Do Use...	Do Not Use...
Wheelchair user	Wheelchair bound
Disabled people/people with disabilities	The disabled
A person with Down’s Syndrome	Mongol
Impairment	Condition
Learning difficulty	Mental handicap
A person with a mental health problem	Mentally ill
Blind person/deaf person	The blind/deaf

7. SPATIAL PLANNING FOR PEOPLE WITH DISABILITIES

It is required to make all buildings and facilities used by the public accessible and functional for the physically challenged through and within their doors without any loss of function, space and usability. It supplements the general requirements of the code and reflects greater concern for the safety of life.

A) PEOPLE WITH SIGHT DISABILITIES

- For People with sight disabilities, orientation can be aided by marking with the use of color, illumination and, in certain cases, the texture of material. Design and plan arrangements should be simple and uncomplicated. Contrasting colors should be used to aid the identification of doors, stairs, ramps, passage ways, skirting boards, etc. Surfaces can be varied to indicate passage ways, changes of direction, etc. Orientation

cues should be specially illuminated. Handrails can be used as a location aid.

- To minimize the risk of falls and injuries, hazards such as posts, single steps and projections from walls should be avoided wherever possible. Hazards should be emphasized by means of illumination and by contrasting colors and Materials.
- People with sight disabilities are often sensitive to glare. Unwanted mirroring affects and reflections may be avoided by attention to the location of windows and illumination, and the choice of floor and wall surfaces. People with sight disabilities often have difficulty in reading signs and other printed information. Blind people are restricted to tactile reading. Visual information in, for example, bus terminals, railway stations and airports should be supplemented with audible information.

B) PEOPLE WITH HEARING DISABILITIES

- People with hearing disabilities have particular difficulty in comprehending sounds and words in noisy environments. Rooms should be acoustically well insulated. In public buildings loud speaking systems should be clearly audible. Supplementary visual information should be provided, for example, in bus terminals, railway stations and airports.
- People with hearing disabilities may rely on lip reading: this is helped if there is good overall lighting which is non-reflective. They may have difficulty using telephones, etc. Audible signals may in certain cases be supplemented with visual signals.
- Induction loops may be installed in auditoria, theatres, meeting rooms, etc, to - improve sound reception for people using hearing aids.

8. CASE STUDIES

A) AN EFFICIENT CAR DRIVING CONTROLLER SYSTEM DESIGNED FOR PHYSICALLY CHALLENGED PEOPLE USING ARM PROCESSOR

In paper submitted the author discusses and bring to you a technology that helps those handicapped who don't have healthy hands to run a vehicle by giving the voice commands. In this vehicle instead of using the steering the driver needs to use his head. So in a way this vehicle is for those handicapped people who can nod their head well. Four switches are interfaced over the neck of the driver, and the vehicle can be controlled by the head movement. And also corresponding tactile switches are activated according to the movement of the head. This is one of a kind of vehicle which will be of a great assistance to the handicapped.

B) TONGUE OPERATED WHEELCHAIR FOR PHYSICALLY DISABLED PEOPLE

The "Tongue Dive System" is a tongue operated assistive technology (AT) developed for people with severe disability to control their environment. Tongue drive consists of an array of Hall Effect magnetic sensors mounted on a mouth piece to measure the magnetic field generated by a small permanent magnet secured on the tongue. The sensor signals are transmitted across a wireless link and processed to control a power wheelchair. In past a lot of assistive technologies have been designed but each one of them had certain demerits.

The tongue is considered an excellent appendage in severely disabled people for operating an assistive device.

9. CONCLUSIONS

At this time when our world is making rapid progress in technological advancements it is required and crucial to include developments for the physically disabled people to make them feel secure and able enough to compete with the world by getting equal opportunities and human rights. All sorts of technical assistance and requirements for planning of buildings in a way that is suitable and accessible for the physically disabled people is the need of the time.

Acknowledgement

Authors are thankful to all the websites/print media/books whose works have been collected for the success of this paper.

REFERENCES

- [1] *Guidelines And Space Standards For Barrier Free Built Environment For Disabled And Elderly People*: CPWD Ministry Of Urban Affairs And Employment India 1998
- [2] *Indian Standard Recommendations For Buildings And Facilities For The Physically Handicapped* Is: 4963 - 1968, 1988.
- [3] NBC (*National Building Code*) 2005
- [4] *ICT AND DISABILITY: Pursuing Inclusive Development through Technology* International Conference – From Exclusion to Empowerment: The Role of Information and Communication Technologies for Persons with Disabilities, New Delhi, India, 24 November, 2014.
- [5] Yuker H E, Block J R & Young J H. *The Measurement Of Attitudes Toward Disabled Persons*. Albertson, Ny: Human Resources Center, 1966. 170 P.
- [6] S Katari Ramaiah, T.Mallikarjun *An Efficient Car Driving Controller System Design For Physically Challenged People Using Arm Processor* ,M E-Issn 2277-2685, P-Issn 2320-976 Ijesr/August 2014/ Vol-4/Issue-8/619-623 Katari Ramaiah Et. Al./ International Journal Of Engineering & Science Research
- [7] Monika Jain, Hitesh Joshi B.” *Tongue Operated Wheelchair For Physically Disabled People* , International Journal Of Latest Trends In Engineering And Technology (Ijltet) Vol. 4 Issue 1 May 2014