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Connecting People With Disabilities: ICT Opportunities for All

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Connecting People with Disabilities:

ICT Opportunities For All

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Table of Contents

WHAT IS ICT?

Information & Communication Technology (ICT) is the study, design, development, implementation, support or management of computer-based information systems, particularly software applications and computer hardware. ICT deals with the use of electronic devices and software to convert, store, protect, process, transmit, and securely retrieve information.

Information and Communication Technology (ICT) has become a central aspect of modern life. Engagement with some educational, employment and social opportunities is dependent upon being able to make use of computers and the internet. For Disabled People, these opportunities can be particularly important. Someone who is housebound may be able to learn on-line, work from home, and/or make contact with services, friends, family and support networks.[1]

PROS AND CONS OF ICT

As with most technologies, there is always a blend of good and bad effects on society. But for a technology to succeed, it must show an overall benefit for people. In the following paragraphs some of the major Pros and Cons related to ICT are discussed.

Pros

ICTs play a crucial role in boosting innovation, creativity and competitiveness of all industry and service sectors. ICT provides us with a new phase of development that will drive growth and sustainable development for the coming decades; however, this growth will only be captured if we invest now in research and innovation for the next generation of technologies.

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[1] Aidis Trust, "Beyond Web Accessibility: Barriers to ICT for Disabled People" http://www.aidis.org/aidis/documents/Beyond_Web_Accessibility_large.pdf

Benefits of ICT for citizens:

ICTs are opening up many new opportunities for citizens and consumers. There is a wide range of applications including healthcare provision, transport systems, as well as innovative interactive systems for entertainment and learning. Innovation in ICT can help improve illness prevention and safety of care, facilitate active participation of patients and enable personalization of care and can also tackle problems associated with the ageing population. Some major benefits to Citizens are briefly described below:

i. **Connection to Friends and family**, no matter where they are on the planet, people can talk to one another if they have access to the right technology. A very good example is of very busy Internet cafe set up at the base camp of Mount Everest.[2]

ii. **Travel and the Environment:** Video conferencing and email have reduced the need for business travel, this has allowed people to have more time at home with their families rather than being stuck in an airport somewhere. In economic terms opportunity cost of traveling for a business man could be very high as he could earn a lot of money in the same span of time if he was not traveling. Lesser need of traveling will allow him to employ his full resources and get maximum benefits. Less travel also means less pollution, as fewer cars and aircraft need to be used.[3]

iii. **Education and Training:** Video conferencing and remote control of another computer has allowed teachers and trainers to run lessons from far away. In the era of globalization, there is a possibility that a PhD supervisor resides in United States and the student lives in Pakistan, through ICT they may get closer interaction without getting face to face with each other.[4]

iv. **Working anywhere:** Being able to access the company network from anywhere means that people are no longer tied to the office, they could just as easily work from home. Because of this, home working ('Teleworking') is becoming more

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[2] Benefits of ICT: http://www.teach-ict.com/gcse/theory/social/miniweb/communicationgood.htm
[3] Ibit
[4] Ibit

common. Also, people working for international corporations can travel from country to country on business and yet settle down to a fully networked local office desk and work as it they are in their home office.[5]

v. **World Awareness:** The 24 hour news networks bring us events from around the world as they happen. This means that as a Society we can react almost immediately. In natural disasters such as the Tsunami, massive aid from nations from around the world was brought to bear within hours. Wars, crimes, tragedies, celebrations are much closer to us than they were 50 years ago.[6]

vi. **Social connections:** Research has shown that over 60 million American citizens turn to the Internet when they need career advice, helping people through an illness or finding a new house. It shows that the Internet has become a cornerstone when searching for vital information and developing close relationship amongst the individuals; forming a virtual community.[7]

Benefits Of ICT for Researchers:

ICT provides valuable tools for the researchers of different fields, such as communication networks, embedded computing and technologies for audiovisual content. These tools help the researcher to find the relevant data in less cost and comparatively less time. It also helps the researcher in formulating his research in more professional and meaningful way.[8]

Benefit of ICT for industry and SMEs:

ICTs account for nearly half of the productivity gains in our economies today. The gains stem both from the production of innovative high value ICT-based goods and services and from improvements in business processes through the diffusion, adoption and use of ICTs across the economy. ICT-intensive sectors include manufacturing, automotive, aerospace, pharmaceuticals, medical equipment and agro-food, as well as financial

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[5] Ibit at 4.
[6] Ibit at 4.
[7] Ibit at 4.
[8] Ibit at 4.

services, media and retail. Benefits reported by firms, as a result of increased use of ICTs, include faster product development, cost and overhead reductions, faster and more reliable transactions, better relationships with customers and suppliers, improved levels of customer service and support, and enhanced collaboration opportunities.[9]

Cons

Laziness: Having all these methods of communicating has a tendency to make people lazy. They may no longer bother to talk face to face; instead they send an email to a work colleague only a few feet away. Family members, each playing or working on their own computers may actually send Instant Messages to each other in the same house rather than talk to one another.[10]

Distraction: At home: With so much available to entertain us, there is less need to actually sit around the dinner table and talk to one another, so technology can have a negative effect on family relationships. Moreover, at educational institutes, text messaging during lessons is a distraction and so this has a bad effect on learning.[11]

Unfit people: Being able to communicate with colleagues from a desk means that people just don't walk around enough to keep fit. So eventually, having a growing population of unfit people may impact on their health and the National Health.[12]

Crime: Items such as Mobile phones are very expensive items and so they tend to encourage theft and other crimes. Secondly, due to the day to day increase in the use of E-Commerce, more and more credit card hacking is taking place, providing incentives to the hardcore programmers to involve in the criminal activities.[13]

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[9] Ibit at 4.
[10] GCSE ICT Revision, "Drawbacks of ICT"
http://gcserevision-barbiegirl.blogspot.com/2006/11/ict-and-society.html
[11] Ibit
[12] Ibit
[13] Ibit

ICT AND PEOPLE WITH DISABILITIES

Over 10% of the world's population and 2.54% of Pakistan's Population suffers from a variety of disabilities. However, information and communication technologies (ICTs) have the potential for making significant improvements in the lives of these persons.[14]

Information and Communication Technology has been identified as an important aspect of the wider strategy for the social inclusion of Disabled People. ICT is heralded as enabling Disabled People to participate fully in the social and economic life of their communities. ICT is a significant force in terms of choice and opportunity for Disabled People. ICT offers the old and the young alike an opportunity to overcome social barriers to interaction and communication that can be caused by the lack of provision for impairments or life-long limiting illness. ICT has also been identified as playing a significant role in offering severely Disabled People an increased degree of independence in everyday life. ICT gives the Disabled Person an improved quality of life through autonomy and empowerment.[15]

ICT have revolutionized life for disabled people.   They are used by:

- Severely disabled people to communicate;
- Dyslexic people;
- The blind and visually impaired;
- Those with learning difficulties.

ICTs - combined with proper methodologies - can offer individuals the ability to compensate for physical or functional limitations, thus allowing them to enhance their social and economic integration in communities by enlarging the scope of activities available to them.

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[14] UNESCO, "ICT and Disabled People"   http://portal.unesco.org/ci/en/ev.php-URL_ID=20486&URL_DO=DO_PRINTPAGE&URL_SECTION=201.html

[15] Ibit

ICT for Children with Disabilities

Doctors describe children with severe disabilities as genies trapped in a bottle - cognitively they are quite intelligent and able to learn like many other children their age, but their bodies won't let them communicate. In most of the cases they are in need of proper aids and tools to express themselves. For example, a boy who cannot speak will try to draw his parent's attention when he sees something interesting. He'll make sounds, so that parents come to know that he's seeing something. ICT may help the kid in expressing himself. The boy can speak with the aid of computer. By selecting pictures and words, he can make sentences, answer questions and even tell a story or he can make selections about what toys he wants to play with.[16]

The ability to communicate allows the kid to build social skills and make friends with children his age. The assistive technology that makes it all possible has been around for two decades, but just within the past two years has been adapted for use by young children. Technologies that help disabled people express themselves can release a great amount of stress that they are in for most of the times due to their inability to express or other people's inability to understand them. The decades-old assistive technology now being adapted for use in children is finally allowing that tiny voice trapped inside to come out and be heard.[17]

OPPORTUNITIES FOR DISABLED PEOPLE THROUGH ICT

1. Distance Education

Distance courses allow students to continue living at home while they are studying, which is economical and often socially advantageous. If a prospective student has a disability, the need to be able to remain in the home environment increases while the need for contact with the outside world must also be met. People with aphasia are often

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[16] Technological Aids In Communication with Disabled Kids.
http://www.askthelawdoc.com/technology/tech09.shtml
[17] Ibit

affected by a combination of disabilities, primarily difficulties with communication, both spoken and written, together with some impaired motor functions. ICT provides participants with the opportunity to attain an enhanced quality of life and in some cases to return to working life. For the group 'people with mild aphasia', the possibility of combining speech and pictures is important to be able to communicate as effectively as possible. To share documents, make use of a 'whiteboard' and make presentations using a computer were common components for the training.[18]

2. Digital distribution of talking books to university students

University students with a reading disability – people with visual impairment, dyslexia and restricted mobility – are now able to get their course literature as talking books in developed countries. Material is placed on internet in most cases to allow easy access. Streaming reading of talking books over the Internet means that students can themselves connect from home and read the relevant books, without needing to go to the local library to download the talking books.[19]

3. Broadband for people with intellectual impairment

Intellectual impairment involves, among other things, difficulties in dealing with abstract concepts and contexts, for example, time, quality, quantity, cause and spatial relations. One consequence of this is that people who are disabled are limited by their capacity to communicate with each other at a distance, for instance, by telephone. If two people can see each other, and in this way perceive body language, pronunciation and tone on the part of the person they are talking to, communication is made significantly easier. Being in control of your everyday life, for example, by gathering and understanding public information, news, participating in leisure interests with others, shopping, attending to your finances, writing to authorities and friends, are important activities that allow full participation in society and are essential for an independent life. For many

[18] IT provides new opportunities for people with disability
http://pts.se/upload/Ovrigt/Om-PTS/infomaterial/broadbandtrials_2005.pdf
[19] Ibid

people with intellectual impairment, participation and the opportunity to live independently is severely restricted. A computer with a broadband connection provides opportunities for enhanced participation and independence.[20]

4. Distance education in sign language

Sign language is the first language of deaf people and it is consequently important for people who are deaf to gain access to education in sign language. The adult education courses in sign language that are currently on offer today for people who are deaf are often arranged at boarding schools far from home. There is consequently a great need for and interest in distance education.

ICT provides three major methods of communication for interaction between the teacher and the participants:

- Video files with course material and assignments in sign language that the participants access via the Internet.
- Participants' feedback to the teacher in sign language via recorded video messages.
- The teachers and participants meet for scheduled lessons in a virtual classroom on the Internet through videoconferencing[21]

5. Winning communication – distance guidance

ICT provides people with disability with effective guidance, for example, about labor market issues. Limiting factors include access to specialists in labor market guidance for deaf people and sign language interpreters. With awareness to the issues in their related fields, disabled persons can increase their standard of living.[22]

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[20] Ibid at. 9
[21] Ibid at. 9
[22] Ibid at. 9

6. Mobile video communications for people who are deaf

Video calls via mobile telephones brought about a revolution in the communication opportunities for people who are deaf. Text messages (SMS) soon became an important means of communication for deaf people. Video calls make it possible for deaf people to use their first language – sign language – for mobile communications. The third generation mobile telephony, 3G, has high capacity and is capable of transmitting moving pictures, essential for allowing sign language use with a mobile. In this way the deaf person becomes less dependent upon physical access to interpreter resources and the need to book such services well in advance, which creates opportunities for more spontaneous communication.[23]

ICT PROVIDING COMPUTER ACCESSIBILITY FOR DISABLED

In human-computer interaction, computer accessibility (also known as Accessible computing) refers to the accessibility a computer system to all people, regardless of disability or severity of impairment. It is largely a software concern; when software, hardware, or a combination of hardware and software, is used to enable use of a computer by a person with a disability or impairment, this is known as Assistive Technology.[24]

Special needs assessment

People wishing to overcome impairment in order to be able to use a computer comfortably and productively may need a "special needs assessment" by an assistive technology consultant to help them identify and configure appropriate assistive hardware and software. Where a disabled person is unable to leave their own home, it

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[23] Ibid at. 9
[24] Technology for Disabled People
http://www.livingwithcerebralpalsy.com/technology-information.php

is possible to assess them remotely using remote desktop software and a webcam. The assessor logs on to the client's computer via a broadband Internet connection. The assessor then remotely makes accessibility adjustments to the client's computer where necessary and is also able to observe how they use their computer.[25]

Considerations for specific impairments

Cognitive impairments and illiteracy

The biggest challenge in computer accessibility is to make resources accessible to people with cognitive disabilities - particularly those with poor communication skills and those without reading skills.[26]

Visual impairment

Another significant challenge in computer accessibility is to make software usable by people with visual impairment, since computer interfaces often solicit input visually and provide visual feedback in response. For individuals with mild to medium vision impairment, it is helpful to use large fonts, high DPI displays, high-contrast themes and icons supplemented with auditory feedback and screen magnifying software. In the case of severe vision impairment such as blindness, screen reader software that provides feedback via text to speech or a refreshable Braille display is a necessary accommodation for interaction with a computer.[27]

Motor and dexterity impairments

Some people may not be able to use a conventional input device, such as the mouse or the keyboard. Therefore it is important for software functions to be accessible using both devices; ideally, software uses a generic input API that permits the use even of highly specialized devices unheard of at the time of software development. Keyboard shortcuts and mouse gestures are ways to achieve this. More specialized solutions like

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[25] Ibid, at 11.
[26] Ibid, at 11.
[27] Ibid, at 11.

on-screen software keyboards and alternate input devices like switches, joysticks and trackballs are also available. Speech recognition technology is also a compelling and suitable alternative to conventional keyboard and mouse input as it simply requires a commonly available audio headset.[28]

Hearing impairment

While sound user interfaces have a secondary role in common desktop computing, usually limited to system sounds as feedback, software producers take into account people who can't hear, either for personal disability, noisy environments, silence requirements or lack of sound hardware. Such system sounds like beeps can be substituted or supplemented with visual notifications and captioned text.[29]

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[28] Ibid, at 11.
[29] Ibid, at 11.

BARRIERS TO ICT FOR DISABLED PEOPLE.

Six inter-related barriers to ICT can be identified in existing literature. These are:

- **Lack of interest**
- **Lack of awareness**
- **Difficulty of access**
- **High cost of ICT**
- **Lack of training**
- **Lack of on-going support**

For the sake of brevity, these barriers will often be referred to throughout the document simply as Interest, Awareness, Access, Cost, Training and Ongoing support. They are presented in the order in which they are frequently overcome by Disabled People seeking to make the most of the opportunities available to them through ICT. In this sense, the above identified barriers can be seen as bottlenecks in the path towards ICT inclusion. People enter this process at different stages. For example, some people may already have an interest in and awareness of ICT having recently retired from a job requiring computer literacy. Others may have money but lack awareness of methods by which they would be able to access ICT.[30]

Interest, Awareness, Access, Cost, Training and Ongoing support are not isolated barriers. They inter-relate and overlap. For example, there is often a cost associated with training or on-going support, sometimes a prohibitive cost. Similarly, awareness of low cost and no cost options can bring ICT equipment within the financial reach of many Disabled People. Above mentioned barriers are briefly described one by one in the following paragraphs.[31]

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[30] Aidis Trust, "Beyond Web Accessibility: Barriers to ICT for Disabled People" http://www.aidis.org/aidis/documents/Beyond_Web_Accessibility_large.pdf
[31] Ibid.

1. Interest

Interest refers to the interest of Disabled People in maximizing the opportunities available to them through ICT. Some people exclude themselves from the benefits of ICT through a lack of interest. Help the Aged and Age Concern have gone some way to addressing this through their focus on promoting computer use in the older community.[32]

A significant problem associated with interest in the use of adapted technologies is the perceived stigma attached to special needs products. Some writers have gone so far as to argue that 'fitting in' may be more important to disabled individuals than independence or a sense of control.[33]

Whether this is or is not the case is outside of the remit of this study. However, at a theoretical level it is possible to understand the way in which neglect of the Universal Design approach could lead to Disabled People being excluded from the use of ICT and taking up the benefits it offers.[34]

2. Awareness

Awareness refers to the awareness of accessible technology and the benefits of computer usage as a tool in tackling social isolation and exclusion. This includes advice and support about relevant and appropriate ICT systems.[35]

'It is critical that Disabled People have the information they need to properly access services and support available to them – often they are unable to apply for support because they don't know it exists or are unable to access it'.[36]

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[32] Ibid at 14.
[33] Ibid at 14.
[34] Ibid at 14.
[35] Ibid at 14.
[36] Ibid at 14.

Whilst some people voluntarily exclude themselves from ICT, others are simply unaware of the benefits and opportunities that such technologies can offer. There has been an impressive drive to promote ICT to older people. For children and younger adults, ICT has become part of the furniture in both mainstream and specialist educational settings.[37]

Awareness changes through time. ICT systems and adaptations become updated as technological advances are made. Additionally changes in the nature of impairment through, for example, the degeneration of a condition, mean that awareness must be maintained rather than simply acquired.[38]

3. Access

Access does not refer to access to information and opportunities through ICT, but rather focuses on access to the technology itself. Readers should not confuse the two; access to opportunities and benefits that ICT offers is the result of overcoming barriers. Access to the ICT, itself, is a specific barrier.[39]

Although ICT adaptations are available, continuous access to the provision may not be readily available and may incur large costs. This is a clear demonstration of the way in which the barriers are closely inter-related; with cost acting as a disincentive for access to the internet and ICT. This is complicated further by the use of inappropriate adaptive technologies.[40]

4. Cost

Financial costs of provision, installation and maintenance of computers, special assistive hardware and special needs software. It is well documented that the majority

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[37] Ibid at 14.
[38] Ibid at 14.
[39] Ibid at 14.
[40] Ibid at 14.

of Disabled People are on low incomes. Many are dependent on state benefit and are more vulnerable to social exclusion than other groups.[41]

Most vulnerable to these costs are those individuals who are not eligible for government provision through statutory funding. This is the substantial majority of Disabled People with more severe impairments. People with severe disabilities are the least likely to be employed or in further and higher education. They are also the most likely to be financially disadvantaged. Incomes for households with at least one Disabled Person are on average between 20% and 30% lower than incomes for all households and households with severely disabled members have, on average, the lowest income of all households with Disabled People.[42]

5. Training

The appropriate basic and specialist training of disabled individuals to cater for the use of specialist hardware/software. People do not avail the opportunities to use the helpful aids provided to them by ICT jut because they do not know how to use it. So it is necessary to provide them with the required training for the tools so that they can increase their quality of life by using those tools.[43]

6. On-going Support

When computers break down isolated Disabled People lose independence. Support enables Disabled People to solve their immediate and on-going problems, as well as make the best use of the technology they have.[44]

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[41] Ibid at 14.
[42] Ibid at 14.
[43] Ibid at 14.
[44] Ibid at 14.

CONCLUSION:

ICT is providing opportunities and making life easier for the disabled by innovations in quick successions. People with different kinds of disabilities are now able to communicate with each other and learn through the tools available for the purpose through ICT. There are numerous advantages and very few disadvantages of ICT as described in above paragraphs which leaves us with overall positive impact of ICT on daily life.

Despite the fact that ICT is helping disables to learn and interact, there are some barriers that come in the way of the disabled to get advantage of the wonderful technologies. Major barrier is of cost. Many of the disabled people cannot afford to use ICT for their routine life. There is a need for minimizing the cost of production of the ICT tools so that maximum population of the disabled may get benefit from them. Second major obstacle is the lack of information. Many of the disabled persons do not know about the available technologies for their needs. So in order to get maximum benefits from ICT, awareness is needed to be developed in disabled so that they know about the technology that may help them. It is encouraging that disabled people, who are often neglected by the society, are taken into consideration mainly through ICT. Increase in the welfare of the disabled will definitely increase welfare of the people associated with them and social welfare will increase.

REFERENCES

1. IT provides new opportunities for people with disability
    http://pts.se/upload/Ovrigt/Om-PTS/infomaterial/broadbandtrials_2005.pdf

2. Technology for Disabled People http://www.livingwithcerebralpalsy.com/technology-information.php

3. Aidis Trust, "Beyond Web Accessibility: Barriers to ICT for Disabled People"
    http://www.aidis.org/aidis/documents/Beyond_Web_Accessibility_large.pdf

4. ICT and Society. "Benefits of ICT"
    http://www.teach-ict.com/gcse/theory/social/miniweb/communicationgood.htm

5. GCSE ICT revision, "Drawbacks of ICT"
    http://gcserevision-barbiegirl.blogspot.com/2006/11/ict-and-society.html

6. UNESCO, "ICT and Disabled People"
    http://portal.unesco.org/ci/en/ev.php-
    URL_ID=20486&URL_DO=DO_PRINTPAGE&URL_SECTION=201.html

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