Disability and ICT in Institutions of Higher Learning: Values and Options for Persons with Disabilities

A paper presented by Abdul Busuulwa on July 25th 2011 at a workshop organized by Action for Youth with Disabilities Uganda at the Faculty of Food Science and Technology - Makerere University

1.0 Introduction

The topic for this paper presents both a challenge and an opportunity for Persons with Disabilities (PWDs) wishing to enter the digital world. It is a challenge because the Information and Communication Technology (ICT) options available to PWDs are rare in such an LDC as Uganda; and it is an opportunity because knowing how many options exist will sort out this problem. Disability and ICT is becoming an issue now because many PWDs are making it to institutions of higher learning and ICT has become embedded in everyday life and is progressively becoming indispensable in public, business, personal efficiency or even in improvement of livelihoods (Baguma, 2008).

To understand this new trend clearly, I will define disability from the perspective of the UN Convention on the Rights of Persons with Disabilities (CRPD), which provides that PWDs include those who have long-term physical, mental, intellectual or sensory impairments which, in interaction with various barriers, may hinder their full and effective participation in society on an equal basis with others. This definition divides disability into four categories (physical, sensory, mental and intellectual); although some disabilities can be multiple – thus appearing in combination – and this paper makes a brief reference to these as well. I will also combine mental with intellectual for ease of discussion.

As for ICT, it can be broadly defined as technologies that provide an enabling environment for physical infrastructural and services development of applications for generation, transmission, processing, storing and disseminating information in all forms, including voice, text, data, graphics and video (National Information and Communication Technology Policy Framework, 2002). In this paper we shall restrict ourselves to the computer, telephone, the internet and any other information system useful in everyday interaction of a student in an institution of higher learning.
What makes ICT an issue for PWDs is the number of unique opportunities and challenges it presents to them in terms of access and usability. This is where management in education institutions has to offer support.

2.0 The values of ICT to Persons with Disabilities
Like the case is for other people, the importance of ICT to PWDs (both as students and lecturers) in institutions of higher learning cannot be over-emphasised. The following are some of the benefits they can enjoy:

- PWDs can benefit from e-learning, which is a useful tool in undertaking long-distance courses as well as sharing knowledge from various institutions;
- Through various electronic journals and search engines, PWDs can obtain research material which may not be easily found in ordinary libraries;
- PWDs can easily undertake class assignments through word processing, graphics and various spreadsheets;
- ICT facilitates easy and cheap communication via e-mail, text messages and other phone services like Skype;
- It may also be beneficial for PWDs to join social networks like tweeter, facebook and LinkedIn;
- Commercial websites like amazon.com and tesco.com can greatly facilitate E-shopping for PWDs;
- Nowadays it is also possible to do internet banking, thereby enabling PWDs to avoid the hustles of physical banking.

3.0 The options for making ICT usable for the various categories of PWDs
Article 9 (2 g) of the CRPD puts the responsibility of taking appropriate measures to promote access for PWDs to new information and communications technologies and systems squarely on the state. This responsibility, by extension, goes to such public institutions as schools and universities to which PWDs are enrolled to study together with non-disabled students. The following ICT options for various categories of PWDs should be helpful in this regard:

3.1 ICT Options for People with Physical Impairment
Examples of physical impairments include cerebral palsy, spinal cord injury, arthritis, muscular dystrophy, multiple sclerosis and polio. These cause functional limitations which may mildly or severely affect the way PWDs use ICT, and they range from poor muscle control to weakness and fatigue, difficulties in speaking, walking and grasping or reaching things, and doing complex manipulations such as push and turn (Vanderheiden and Vanderheiden, 1991).
The ICT solutions for offsetting some of the functional limitations caused by physical impairments include an alternative keyboard with a layout of keys that matches a particular range of hand motion, a pointing device (head-mouse, head-pointer or mouth-stick), a specialized mouse and voice recognition software, and an eye-gaze system (Lawson, 2002; Brewer, 2005).

However, before looking out for the assistive technologies mentioned above, which are often even very expensive, it is vital to add that computers and mobile phones have features which can be reconfigured for the benefit of some people with physical impairments. For instance, in Windows XP StickyKeys can be turned on to allow someone who cannot press certain keys in combination to do so individually (say ctrl+alt+delete) or BounceKeys to prevent inadvertent repeated keystrokes.

3.2 ICT Options for People with Hearing Impairment
Hearing impairment takes two forms -- hard of hearing and profound deafness. The primary difficulty that people with hearing impairments experience is receiving auditory information. A person is considered deaf when sound must reach at least 90 decibels (5 to ten times louder than normal speech) to be heard (Vanderheiden and Vanderheiden, 1991).

Whereas Sign Language and lip reading are the basic communication modes for most deaf people, auditory information can also be received by presenting it redundantly in visual and/or tactile formats (Vanderheiden and Vanderheiden, 1991). Technologies which can offer such capabilities are Telecommunication Devices for the Deaf (TDDs), telephone signaling devices (TSDs), and captions for audio content. Likewise, in Windows XP there is a SoundSentry which can display visual warnings whenever the system makes a sound. The hard of hearing would, in addition, benefit from increasing the volume range and lowering the frequency of high pitched auditory outputs. Those who can use hearing aids may fit them with coils in order to receive telephone calls or hear what others say more clearly when ambient noise is reduced.

3.3 ICT Options for People with Visual Impairment
Visual impairment represents two broad categories of people – those with low vision (dim or hazy vision, extreme far- or near-sightedness, colour-blindness and tunnel vision) and the totally blind (Alexander, 2008). A person is termed legally blind (visually impaired) when his/her visual acuity (sharpness of vision) is 20/200 or worse, or when his/her visual field (the total area in which perception is possible while an individual is looking straight ahead) is less than 20 degrees; in the best eye after correction (Vanderheiden and Vanderheiden, 1991).
People who are totally blind usually rely on a screen reader (software that translates the contents of the computer or mobile phone screen to either speech output or Braille display). Some of the common screen readers include JAWS For Windows, Window Eyes, Refreshable Braille Displays, Supernova (usable on computers), and Mobile Speak and Talks (used on mobile phones). It is also possible to substitute standard screen readers with text-based browsers or voice browsers in the case of accessing the web. But of course all these depend largely on the design of websites as features like ‘text only’ or voice browsers are usually embedded therein.

Most low vision people can benefit from simple compensations like magnifiers, glare reducers, bright lighting, high contrast colouring, and larger lettering (Vanderheiden and Vanderheiden, 1991). However, severe low vision may necessitate using screen magnifiers such as Magic, Zoom text and Mercury (for computers), and Mobile Magnifiers and ZOOMS. Screen magnifiers are sometimes used in combination with screen readers to enhance output.

People with low vision may again have the option of increasing the size of system fonts and images to avert the need for screen magnifiers. For colour blindness in particular, which is a lack of sensitivity to certain colours, some websites have an allowance for individuals to use their own style sheets to override the font and background colour-choices of the author (Brewer, 2005).

3.4 ICT Options for mental (Intellectual) Impairments
The functional limitations associated with mental impairments can vary from memory loss to problems of perception, poor problem-solving and poor conceptualization. Seizure disorders, especially photosensitive epilepsy, also belong to this categorization. Seizure disorders are often triggered by visual flickering or audio signals at a certain frequency.

Although people with mental impairments rarely make it to institutions of higher learning, it is vital that the few who do are given adequate support. Unfortunately, few ICT solutions exist for people with mental impairments. However, the use of graphics, low language loading and simple or obvious sequences, especially on websites, may benefit them greatly. In addition, memory or cuing aids (not necessarily ICT components) can be useful tools for triggering information that a student has studied but has difficulty recalling. People with seizure disorders may turn off animations, blinking text, or certain frequencies of audio in websites in order to avoid triggering seizures (Brewer, 2005).
3.5 ICT Options for multiple Disabilities

It is common to find the causes of one impairment causing others. For instance, diabetes can cause blindness and loss of sensation in fingers; Rubella can cause deaf-blindness; a physical impairment emanating from cerebral palsy may also cause mental and/or hearing impairments, speech disorders or even visual impairments.

For someone with mild deaf-blindness, a combination of screen magnification and screen reading software may be useful. A Refreshable Braille display is the only option for someone who is severely deaf-blind. For someone who cannot move his or her hands as well as not being able to see the screen properly due to cerebral palsy, a combination of speech input and speech output might be useful; hence voice recognition software as well as a screen reader.

4.0 Conclusion

We should recognize that whereas accessible ICT benefits PWDs greatly, it can be a solution for a lot more people. For instance, text-based browsers such as Lynx, which can be used by blind people in lieu of Graphical User Interface browsers, can as well benefit many people who have low bandwidth connections and do not want to wait for images to download (Brewer, 2005). Likewise, requirements for colour contrast and flexible font sizes are similar for non-disabled people who use mobile devices as well as people with low vision who interact with computer (Yesilada, et al., 2009).

But the fact remains that ICT is the ultimate liberator of PWDs from a myriad of difficulties associated with communication and information access. For the blind, information accessed electronically can remove the burden of storing or carrying around huge volumes of textbooks in Braille. For the deaf, the accessible features explained earlier can make communication cheaper by reducing or removing the need for a Sign Language interpreter. For the physically impaired, the problems associated with an inaccessible physical environment can be offset through e-learning, e-commerce and e-mail. The learning difficulties of people with intellectual or mental impairments can, to a large extent, also be reduced through certain accessible ICT features.

Nevertheless, while we celebrate the ICT solutions so far attained, we should not lose sight of the ever-changing landscape of ICT in terms of usability for PWDs. This is becoming even more complex with the hardware and software modifications coming on the market every passing day. For instance, the transformation of the Internet from a text-based medium to a robust multi-media environment is complicating the problem of access further for some PWDs (Waddell, 1999). Furthermore, Touch screen technology may affect the way PWDs use certain ICTs if the keyboard option is totally ignored.
References

Accessibility Options in Windows XP and PC Clusters (undated). Retrieved on October 10th 2010 from the University of Bradford website: http://www.brad.ac.uk/lss/.


