



Assistive Technology for Aged and Physically Challenged People

Rohit Ravikant Rathod

Department of Electronics and Telecommunication,
Government College of Engineering, Chandrapur

Dinesh Vitthalrao Rojatkar

Department of Electronics and Telecommunication,
Government College of Engineering, Chandrapur

ABSTRACT

For older individuals, the experience of loneliness can lead to mental health conditions including depression. In addition, older adults who do not stimulate their cognitive memories can lead to Alzheimers Syndrome and other memory loss conditions. Surprisingly, there is an increase of older adults using the Internet for communications. However, there are still some challenges older adults face with technology. Aged people may have a fixed income or depend on Social Security or Disability support; this creates problems as computers can be expensive to purchase. In addition, older adults may have difficulties with using the computer, as far as using the hardware or software components. Software obstacles include: small text size, complex menus options, and high level of stimulation from animated software components. This can also include the use of the Internet and the World Wide Web. This research will study the interactions between older adults and their use of mainstream technologies.

Keyword: *assistive technology ,older adults, sensitive training, aging, open source, senior citizen, elderly, aged user*

INTRODUCTION

The population of people with disabilities and older people is growing and technology is also developing at a great speed. Assistive technology, when used appropriately, has the potential to support people with disabilities and older people to exercise their human rights and become more active members of society. The Disability Federation of Ireland and Enable Ireland share a concern that current service provision for Assistive Technology is fragmented and under-resourced to meet these emerging changes. We have produced this paper to prompt discussion and action on a more comprehensive Assistive Technology service. We lay out both immediate and longer term recommendations to ensure the inclusion of people with disabilities and older people in Irish society[5].

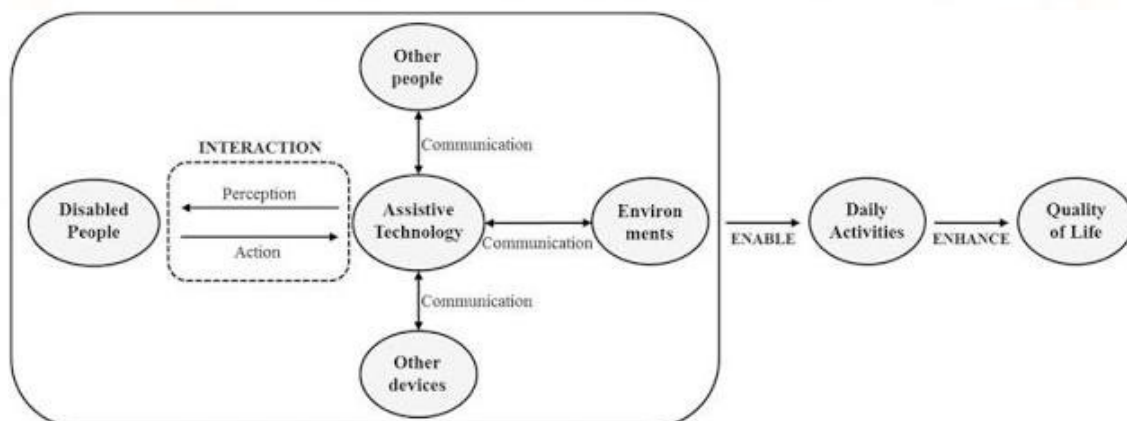


Figure: Block Diagram Of Assistive Technology[3]

Why do we need to focus on Assistive Technology?

An appropriate and effective Assistive Technology service could provide a significant return on investment for both the State and the Assistive Technology user. It could also help to address gaps in the implementation of many government policies that aim to support citizens to participate fully in society.

Assistive Technology can:

- Support people to access their human rights (United Nations Convention on the Rights of Persons with Disabilities)
- Support the State to deal with resource constraints on services and social welfare spend
- Support the State to respond to population increases amongst people with disabilities and older people
- Offer value for money in terms of user satisfaction and increased quality of life and cost savings
- Support people to complete their education
- Support people to get and retain employment
- Support people to live in their community
- Support people to become digitally literate[12].

TYPES OF ASSISTIVE TECHNOLOGIES

There are many types of Assistive technologies that can be used to assist older individuals and people with disabilities when using technology, primarily computers. Virtual magnifiers are programs that magnify a certain portion or whole screen that aid a person with disabilities to read or view objects more clearly. While well-developed virtual magnifiers are now available in most current operating systems, they are not with older or some newer operating systems. Some operating systems contain magnifiers that are not well developed or create instability within the operating system. This often creates frustration within users and can sometimes crash the operating system. Some magnifiers provided excellent coverage however, the mouse is disabled. Some magnifiers provide limited mouse controls, however, they can distort or disposition the icons. This can be especially difficult for people with disabilities, as they tend to prefer if objects stayed within a certain amount of space for long periods[7].

Voice recognition software and narrator software is an excellent tool for people that have vision problems or cannot use their hands to control a keyboard or

mouse. Unfortunately, voice recognition software is limited. In order for it to work properly, an individual must talk clearly with no accent and must speak within a certain amount of time. For a person with speech deficiency, this is next to impossible. Open source voice recognition software within this community should be designed around people with speech deficiencies. Using artificial intelligence, voice recognition software could learn speech patterns of the individual with the speech deficiency. Narrators have also been under development. Narrators are often slow in response; tend to hold on to a phrase or command, and often attempt complete that narration. However, the software will fail to grab the other commands or tends to be behind in the list of commands by the user. Narrators must be able to follow mouse movements or commands and stop the previous narration of the command if the user has made a position change [2].

In Microsoft Windows, aged individuals and people having disabilities have access to multiple tools including Text to speech playback, touch-screen gestures (for touch screens only), magnifying glass, onscreen keyboard, and the ability to change the screen resolution and icon size[6].

The application, Easy stroke Gesture Recognition used by Linux distributions is another alternative to using the keyboard to enter certain commands or tasks. This application uses a database, created by the user, that store specific mouse movements. These user generated mouse movements will then command the operating to complete a certain task. For example, if a user has difficult time typing particular news website in a search engine, that user can create a mouse gesture that is easy to remember. This mouse gesture becomes an alternative command for access that website. Other useful applications can aid people with disabilities, especially those with low functioning autism. Children with low functioning Autism generally has difficulty speaking to others. Kmouth is a common application used that synthesizes text from a screen to audible words. This can aid people with disabilities to communicating with others, especially when expressing feelings towards one another [9].

PROBLEM DEFINITION

1. Society and Aging

As individuals age or begin to suffer from disabilities, the challenges in society become more noticeable.

Mobility and accessibility to information can become increasingly more challenging to overcome. Buildings and public infrastructures may not have the appropriate accessibility. In addition, the economic budget of an older individual is more likely to be fixed. Information Technology also brings challenges to older adults[12].

2. Challenges within Information Technology

Computers and mobile devices are increasingly become more expensive over the years. Most wireless carriers around the nation have sleek smart phones with full touch LCD screens and few buttons. The average start up interface of these phone often resemble small computers, however, the dialup interface is often hidden or compressed within another menu. For older individuals, there is another issue, Information Technology (IT). Although, the integration of IT may be beneficial within the average persons life, they can often be frustrating and confusing for people with disabilities. People with disabilities often struggle to perform day-to-day tasks. With the inclusion of technology, one may think those tasks are easier, but that is incorrect. Computers and the Internet today may be simple to use for the average individual, but they differ for people with disabilities. Operating systems, Internet web pages, and other computer components often contain menus and navigations bars with many icons and other services. People with disabilities are intimidated by this, they would rather prefer simple menus, but unfortunately, the World Wide Web is generally rushed in difficult page organization and setup. Other problems within IT today, are the interaction with computer components. Mice and keyboards are shrinking, screens that are either large or small, often display text can be unclear, and buttons with unclear meanings often frustrate individuals. Currently, people cannot use technology components without referring to manuals, and yet, these manuals contain page after page of small print and sophisticated text [9].

3. Challenges within Web Technologies

Today, few websites cater to the needs of older individuals or people with disabilities. Some businesses or personal websites might be prejudice to older individuals or people with disabilities. Some may not know about existing assistive web technologies[11].

METHODOLOGY

1. Assistive Technology for physically challenged people Many of technologies are use to improve the lives of physically challenged people. some of those are describe below

1.1 Wheelchairs

Wheelchairs are devices that can be manually propelled or electrically propelled and that include a seating system and are designed to be a substitute for the normal mobility that most people enjoy. Wheelchairs and other mobility devices allow people to perform mobility related activities of daily living which include feeding, toileting, dressing, grooming, and bathing. The devices comes in a number of variations where they can be propelled either by hand or by motors where the occupant uses electrical controls to manage motors and seating control actuators through a joystick, sip-and-puff control, or other input devices. Often there are handles at backside the seat for someone else to do the pushing or input devices for caretakers. Wheelchairs are used by people for whom walking is difficult or impossible due to illness, injury, or disability. People with both sitting and walking disability often need to use a wheelchair or walker[12,6,9].

1.2 Walkers

A walker or walking frame or Rollator is a device for physically challenged people who need additional support to maintain balance or stability while walking. It consists of a frame that is about waist high, approximately twelve inches deep and slightly wider than the user. Walkers are also available in different sizes, such as for children, or for younger people. Modern walkers are height-adjustable. The front two legs of the walker may or may not have wheels attached depending on the strength and abilities of the person using it. It is also common to see caster wheels or glides on the back legs of a walker with wheels on the front.[4]

1.3 Prosthesis

A prosthesis, prosthetic, or prosthetic limb is a device that replaces a missing body part. It is part of the field of biomechanics, the science of using mechanical devices with human muscle, skeleton, and nervous systems to assist or enhance motor control lost by

trauma, disease, or defect. Prostheses are typically used to replace parts lost by injury (traumatic) or missing from birth (congenital) or to supplement defective body parts. Inside the body, artificial heart valves are in common use with artificial hearts and lungs seeing less common use but under active technology development. And Other medical devices and aids that can be considered prosthetics include hearing aids, artificial eyes, gastric bands, and dentures[5,9]. Prostheses are specifically not orthoses, although given certain circumstances a prosthesis might end up performing some or all of the same functionary benefits as an orthosis.

Prostheses are technically the complete finished item. For instance, a C-Leg knee alone is not a prosthesis, but only a prosthetic component. The complete prosthesis would consist of the attachment system to the residual limb usually a "socket", and all the attachment hardware components all the way down to and including the terminal device. Keep this in mind as nomenclature is often interchanged[8,12]

CONCLUSION

The ecosystem required for effective service for Assistive Technology is a complex proposition that echoes the complexity of peoples lives and needs. It is something that we must address comprehensively, in recognition that Assistive Technology is a fundamental vehicle to accessing human rights, one that is constantly evolving. This paper has explained why Assistive Technology matters, and sketched out the current system of provision. At present we do not have a proper coherent ecosystem to address this issue. This project have reviewed the experience of other countries, and laid out the key tenets of an ecosystem that can be shaped from the bones of current provision models and reflects the aspirations of Irish policy. It also supports current policy directions such as moving people in the community living, transforming of the day services, supporting people into their work and to stay in their own homes for as long as possible, and providing fair and equitable supports through primary care and disability network services throughout the country. We have also highlighted four starting points with the greatest leverage for creating immediate change. These include convening cross departmental groups to consider the AT passport and a supporting

infrastructure and conducting baseline research to establish current spend and future need.

REFERENCE

- [1] McHugh, B. (n.d.). Local News: West Palm Beach, Palm Beach County, Martin & St. Lucie Counties — The Palm Beach Post. The Palm Beach Post News. Retrieved February 25, 2012.
- [2] Seashore, C. (1968, April). What Is Sensitivity Training? National Training Labs, Institute for Applied Behavioral Science, 1201 16th St., N.W., Washington, D.C. 20036(Reprint of article).
- [3] Lesnoff-caravaglia, G. (2007). Gerontechnology. In G. Lesnoff- caravaglia, Gerontechnology: Growing Old in a Technological Society. (p. 15). Springfield: Charles C .Thomas Publisher, LTD
- [4] Coppola, J. F., Wexler, S. S., & Thomas, B. (2011). Service-learning computing courses assist with technology needs in community based organizations serving older adults . Systems, Applications and Technology Conference (LISAT), 2011 IEEE Long Island, 1-6.
- [5] Simulating Age 85, With Lessons on Offering Care - NYTimes.com. (n.d.).The New York Times. Retrieved February 24, 2012.
- [6] Coppola, J. F., Wexler, S.S., Drury, L., Heyman, J., Thomas, B., Tshinkel, Barnes, C. (2012). A Case Study:: Growing Community Partnerships with a Service-Learning Intergenerational Computing Course. Journal of Community Informatics, Special Issue: Community Informatics and Older Persons.
- [7] Pace University. (2011). Sensitivity. Gerontechnology Pace University Gerontechnology Program. Educational. Retrieved February 21, 2012.
- [8] Kowtko, M. (2012). Open Source Assistive Technology Website. Columbia College Undergraduate Student Research Journal, 1-4 unpublished.
- [9] Olsen, M. G. (2011, January). How Accessible is the Public EuropeanWeb? Retrieved
- [10] Lazar, J., Dudley-Sponaugle, A., & Greenidge, K.-D. (2004). Improving web accessibility: a study of Computers in Human Behavior, 269-288.14
- [11] Craven, J., & Snaprud, M. S. (2005, August 3). Involving Users in the Development of a Web Accessibility Tool.
- [12] Dolson, J. C. (2009, June 30). Web Accessibility and the Law. Retrieved from Practical Ecommerce: Insights for Online Merchants: