Smartphones Application for Ageing and People with Disabilities

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***Abstract*— Smart phone application technology is progressing, This is marked by a variety of new applications every day. In this paper I will discuss smart phone applications for people with aging and disability. How can they still be able to communicate with developing technologies such as smart phones despite the limitations they have. I imagine the victims of the earthquake and tsunami who had to accept the condition of their bodies to be deformed even though previously they could use their smart phones with complete limbs. How difficult are they with disabilities to use smartphones like other normal people. One way to help them continue to use their smartphones for the purposes and distribution of all the advantages they have is for example by the way every smartphone product has an application for disabled people without having to download it first. So they can splash a smart phone like someone who is not disabled. They are not hampered by their limitations. In this paper I use a literature review method so that previous research can be realized in the production of smart phones in the future. Let's think, what if one day we become like them? How helpful if this can be realized in every smartphone production.**

Keywords- Usability-Accessibility; Ageing / Handicapped societies

E-Government service for Web Accessibility for Handicapped & Ageing :

- Online service and application
- One stop service
- Portal for the elderly and handicapped
- Call center for the elderly and handicapped
- E-tax and e-pension system
- Information security
- E ID for the elderly and handicapped
- E-local government (digital on-line public service)

I. INTRODUCTION

ICT has opened up many new opportunities for citizens and consumers. It is imperative that people with disabilities are entitled equal access to education and employment, equal rights to parenthood, property ownership, political rights, and legal representation. Computers, adaptive technology and the internet can help disabled people take advantage of education and employment opportunities leading to sustainable long term empowerment opportunities. For a developing country like Bangladesh which is home to over 13 million disabled persons, access to ICT remains a dream for many. A recent report from the Joseph Rowntree Foundation, UK states even if overall poverty falls, it is found to be increasing among disabled persons. Therefore, it is of no surprise that in Bangladesh, where most of its population is poverty stricken, people with disabilities are most neglected, marginalized and discriminated against. In these cases, creating self sufficiency and independence through the fruits of technology would play a pivotal role towards ensuring their basic rights and dignity.

The world report on disability affirms that over one billion people in the world live with some disabilities and there are about 150 million school-aged children with disabilities. Many of these children are excluded from educational opportunities and do not complete primary education. At the same line, recent UNESCO Global report (UNESCO Global Report, 2013) indicates that people with disabilities face a wide range of barriers, including access to information, education and a lack of job opportunities. However Information and Communication Technologies (ICT) can be a powerful tool in supporting education and inclusion for persons with disabilities. Technological development can enable people with disabilities to improve their quality of life (Arrigo, 2005). The successful application of such technologies can make classrooms more inclusive, physical environments more accessible, teaching and learning content and techniques more in tune with learners' needs (UNESCO Global Report, 2013).

In fact, the continuous progress of ICT raised the need to move toward improving the learning quality applied in education and training systems by addressing new perspectives and opportunities. e-Learning emerges as the answer to fulfill that need (Ben Brahim et al., 2013) and vouches to attend the learning needs of the students in a personalized and inclusive way. Actually, there is no shortage of optimism about the potential of e-Learning to reduce barriers to education and improve the lives of individuals with disabilities (Klomp, 2004). Therefore, developing accessible online educational environments appears as a principal solution to address this issue and to remove the barriers that people with disabilities may meet when they access these learning technologies. An appropriate technology has to provide people with disabilities with adaptive and personalized learning experiences that are tailored to their particular educational needs and personal characteristics. It should also improve their satisfaction, learning speed and learning effectiveness.

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In this paper, we propose a conceptual abstract view of an accessible learning environment and we describe a new process allowing the translation of a conceptual model into a specific code adapted to the user's individual learning context. The translation process corresponds to a personalization process which supports people with disabilities learning by accommodating and adapting the learning process to their needs.

In this context, many researchers developed specific tools dealing with specific needs for people with disabilities (Seale and Cooper, 2010, Jemni and Elghoul, 2007, Elghoul and Jemni, 2009). However, these tools do not allow the user to adapt the contents to other needs. In fact, when we want to update, we have to modify existing codes. The new codes can be validated only by tests which make it difficult to guarantee the soundness of the result and the preservation of previous properties. For these reasons, we should consider accessibility from an early stage of the systems lifecycle by giving generic models which could be considered as a reference for the following steps of development. By this way, any tool is an instance of such a model and any modification could give an updated content generated by this generic model as a new instance which refines the previous one.

II. BACKGROUND

A. e-Accessibility and People with disabilities

In this section I provide an overview of accessibility needs for people with disabilities. I focus on web access and assistive technologies that offer new designs and tools that meet the requirements of persons with disabilities. Then I present the basic concepts of e-learning that can be accessed and the status of his art.

Disabilities can be grouped according to the type of impairment; generally there are four groups (Kavcic, 2005):

- Mobility impairments (restricted movement or control of arms, hands and fingers): refer to physical disabilities that affect the ability to move, to manipulate objects, and to interact with the physical world
- Visual impairments (blindness, partial sight and color blindness): include the range from low vision to full blindness, where the user cannot use the visual display at all. Although people with visual impairments have the greatest problem with information displayed on the screen (especially graphics and pictorial information), the use of a pointing device, which requires eye-hand coordination (such a mouse), may also pose an issue for them.
- Hearing impairments (deafness and hearing loss): have difficulties detecting sounds or distinguishing auditory information from the background noise. Deaf individuals cannot receive any auditory information at all. Many of them communicate through the Sign Language that differs significantly from the spoken language. Cognitive impairments (including cognitive, language and learning disabilities like attention deficit disorder, dyslexia, dementia, etc.): there are a wide range of cognitive impairments, including impairments of thinking, memory, language, learning and perception.

B. Assistive technologies and The Web Accessibility Initiative (WAI)

Assistive or enabling technology includes devices, tools, hardware, or software, which enable, partially, people with disabilities to use the computer. It presents an alternative way to access the content on screen, command the computer or process data. Specific adjustment software or devices for manipulating the computer include (Arrigo, 2005).

- Screen reading software (speaks displayed text and allows simulating mouse actions with the keyboard),
- Screen magnification software (for enlarging the content of the screen),
- Braille display (for displaying Braille characters),
- Alternate input devices (e. g. Screen keyboard) and special keyboard (to make data entry easier),
- Keyboard enhancements and accelerators (like StickKeys, Mousekeys, repeatKeys, SlowKeys, BounceKeys, or ToggleKeys), mnemonics and shortcut keys,
- Alternative pointing devices (e. g. Foot operated mice, head mounted pointing device, or eye tracking systems).

These aiding technologies can be either devices or equipments (hardware) e.g. Braille, or software applications e.g. screen reading software. However, these technologies do not seem sufficient for providing full support to people with disabilities. Web content providers should also participate in the inclusion process by making arrangements that allow particularities of people with disabilities to be taken into account when creating web content. Several efforts were conducted toward addressing this issue.

Being conscious of the constraints witnessed by people with disabilities in everyday life especially with web based applications, the W3C carried out a key solution promoting people with disabilities in accessing, using and interacting with the web through the Web Accessibility Initiative (WAI).

The WAI develops strategies, guidelines, and resources to make the web accessible to people with disabilities (W3C Web Accessibility Initiative, 2013). The WAI targets, among others, web content through Web Content Accessibility Guidelines (WCAG) (Web Content Accessibility Guidelines, 2013), authoring tools through Authoring Tools Accessibility Guidelines (ATAG) (Authoring Tools Accessibility Guidelines, 2013) and user agent through User Agent Accessibility Guidelines (UAAG) (User Agent Accessibility Guidelines, 2013). In the WAI model, the WCAG is complemented by accessibility guidelines for browsing and

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access technologies (UAAG) and for tools to support creation of Web content (ATAG) (Sloan et al., 2006).

These guidelines are mainly based on the following four criteria:

- Perceivable – information and user interface components must be presentable to users in ways they can perceive,
- Operable – user interface components and navigation must be operable,
- Understandable – information and the operation of user interface must be understandable,
- Robust – content must be robust enough that it can be interpreted reliably by a wide variety of user agents, including assistive technologies (Laabidi and Jemni, 2009).

The WAI was widely deployed in various web application areas aiming to include the left out user groups. In fact, this inclusion became an acquired right for the people suffering from disabilities in different countries. Since education is one of the major concerns of ICT, applying WAI in this domain is very promising.

III. CONCLUSION

In this paper we proposed a new approach for the development of accessible e-Learning environments. It consists of three phases: design, implementation and validation. It is noteworthy that our work is not limited only to people with disabilities but it includes also anyone disabled by his/her context. We expect that our contribution will empower the efforts deployed toward full inclusion of people with disabilities. The elaborated meta-model for accessible e-Learning systems helps to make automatic the generation of an accessible content, the conformance of the content to e-Learning and accessible properties as well as the transformation into an implementation adapted to specific needs and specific contexts. This meta-model supports accessible e-Learning application by adding two concepts: the concept of presentation "Display" and the concept of control "Control". We avoid in particular ad hoc accessibility implementation since we are considering accessibility from an early stage of systems lifecycle and any generated system preserves the properties specified in the corresponding model and allows the preservation of these properties after any modification. As a perspective of this work, we propose in the future to investigate the modeling transformation process from abstract models to specific models. In addition, we intend to extend the application of our approach to other e-Learning platforms with a special focus on mobile learning.

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