

# Exploring the Usability and Accessibility of an E-Learning System

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**Abstract**— Use of ICT in education brings new opportunities for people with special needs. Web based learning and adapted e-learning materials provide an alternative way of learning comparing to traditional classroom learning. There are significant barriers preventing many users, often disadvantaged citizens such as people with disabilities and elder people, from accessing many services and information provided by E-solutions, especially government and commercial web sites and public access systems. Link-up between the technology and humans having different abilities, requirements and needs opens new areas and trends that require use of scientific approaches to searching for new methods and solutions, as well as to stimulating the development. Information and communication technology (ICT) already penetrated deeply into the education area supporting the needs of students at different educational levels. This support is particularly important for people with special needs. This paper summarizes the potential benefits of usability and accessibility of any E-learning system.

**Index Terms**— ICT, usability, accessibility, e-Government, assistive technology.

## I. INTRODUCTION

In the age of Information and Communication Technology, it should be possible to learn being “far away” from the teaching sources. There are unique advantages to distance education. Its “any time, any place” nature could be part of a winning strategy for particular needs such as decongestion of overcrowded education facilities, support for students or teachers who live far from schools and universities, long life education. Moreover, it could be a valuable opportunity for specific groups of students, such as disabled students, if the learning material is actually accessible to them. There is a significant barrier preventing a large number of citizens from making effective use of the e-services provided by governmental and commercial web sites and public access systems. The usability and accessibility of e-services must be improved so that they are easy to use and accessible to people with disabilities and elderly people and other emerging groups such as people who have immigrated from one country or culture to another.

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## II. BENEFITS OF USABILITY AND ACCESSIBILITY

Design of e-learning materials is not a simple process. These materials should be well planned, designed and evaluated in order to assure efficient and simple use. The evidence of efficiency of the ICT-supported learning leads us to raising the question if distance learning using ICT could be successfully used also for educating persons with special needs. To enable citizens to derive full benefit from the single market and the information society can only be achieved if e-services are both usable and accessible.

Many web developers know that web accessibility is important, but many do not understand the intricacies of the Web Content Accessibility Guidelines [1] developed by the Web Accessibility Initiative (WAI) of the World Wide Web Consortium, or know how to apply them.

### 2.1 Matching technology to Asian needs

Usability has an important role to play in helping adapt technologies from the developed world and services to Asian cultural needs. For example, in India, many people rely on using a mobile phone for services such as banking and health information services [2].

Many Asian countries also have a low level of development [3] and their consumers may not have the technical aptitude or specialized skills to use complex systems and services. The design of easier to use systems that more closely match local user needs is an important way to bridge the gap between the technologically advantaged and disadvantaged.

### 2.2 Special needs: accessibility and Design for All

User centered design provides a framework for achieving accessibility and Design for All. The Design for All philosophy emphasizes the need to provide access to information systems for the widest possible range of users, particularly young and older people, and those with physical, sensory and cognitive limitations. User centered design provides a framework within which to identify and understand the needs of such diverse user groups, and plan for how to integrate those needs into the development process [4].

### 2.2 Special needs: elderly citizens

Another issue which deserves attention for the design of information applications is the increasing proportion of elderly people in developed societies. As people grow older, their physical, visually, auditory and cognitive abilities decline. The proportion of elderly people is expected to almost double in Asia by the year 2025. By the year 2050, a four times of the population will be over 60 years of age [5]. This increase in the population of elderly people needs to be considered in the light of the corresponding shrinkage in

more recent generations.

Now a day, the people are connected to internet especially youngsters but still older or retired people using internet is quite small. For example, in India the internet is only used by 1% of over 55s, compared to 87% of 19-45 year olds in the year 2008 [6] and 1.8% of over 55s compared to 91% of 19-45 years old in the year of 2012[7]. This raises the question of whether older people will be able to enjoy the benefits of the connected future, with information available electronically on tap, and convenient and inexpensive shopping on-line. With the growing average age of the population in developed countries, systems have to take this factor into account both concerning the functional needs of this group as well as concerning the actual user interface of the system.

### 2.3 Special needs: people with disabilities

Providing e-services which are more accessible and more usable will have a considerable impact on the daily lives of people with disabilities. For people with disabilities, the accessibility and usability of both mainstream and specialist technologies are currently very poor. People with disabilities are currently very frustrated by the poor usability of their technologies and of the Internet [8]. There is a very high rate of discarding assistive technology that is undoubtedly related to poor accessibility and usability issues. Yet technologies can transform the lives of people with disabilities if they are designed appropriately.

Assistive technology can allow people to do things they could not previously do (e.g. non-speaking people can communicate with Augmentative and Alternative Communication devices in ways which were simply impossible before computer technology) and do things far more effectively. Access to mainstream technologies is also extremely important for people with disabilities. As able-bodied people rely increasingly on technologies such as mobile phones and digital television, there is a fundamental need to ensure that these technologies are also accessible to and usable by people with disabilities. Thus there is a great need to consider both accessibility and usability issues in technology for people with disabilities.

### 2.4 Industrial competitiveness

Usability for all should be the major design objective for an interactive product or system: that it can be used for its intended purpose by the intended users. Increased usability and accessibility will bring significant benefits to Asian industrial competitiveness.

Most existing approaches to software and systems quality focus exclusively on adherence to technical and process requirements. Insufficient consideration of user needs and consequent poor usability has been one of the major reasons why systems are either partially used, misused, abused, not used at all or have failed to gain broad acceptance. This problem is being aggravated as public users become an increasingly relevant target group for the information market. Especially for public users, applications have to be easy to use and must address usability aspects such as enjoyability that are usually neglected in professional applications.

### 2.5 Reducing risk of failure

The Standish Group found that only 32% of IT projects completed were on time, on budget, and delivering the functionality required; 44% of IT project were “challenged”— meaning that they were not on time, not on budget, or not delivering the functionality required; and 24% of IT projects failed or were abandoned. One of the major causes is inadequate user requirements. User centered design is a very cost-effective means of identifying user requirements and reducing the financial risk of releasing a system which will fail to meet its objectives in use [9].

## III. PROVIDING GUIDANCE: E- GOVERNMENT

India lacks a full fledged ICT framework for implementation of e-governance. Complete implementation of E-governance in India will include building technical Hardware and Software infrastructure. It will also include better and faster connectivity options. Newer connectivity options will include faster Broadband connections and faster wireless networks such as 3G and 4G. The infrastructure must be built by Government, Private Sector as well as individuals. Infrastructure will also include promotion of Internet Cafes, Information and Interactive Kiosks. However while building technical infrastructure, disabled persons must also be considered. The technology implemented, shall incorporate the disabled persons.

Apart from building technical infrastructure, the Government needs to build its institutional capacity. This will include training of Government employees, appointment of experts. Along with the Government has also to create an Expert database for better utilization of intellectual resources with it. Apart from this, the Government has to equip the departments with hi-technology and has also to setup special investigating agency.

For better implementation of e-governance, the Government will need to frame laws which will fully incorporate the established as well as emerging technology. Changing technology has changed many pre-established notions; similarly the technology is growing and changing rapidly. It is important, that the Government makes laws which incorporate the current technology and has enough space to incorporate the changing future technology. These IT laws need to be flexible to adjust with the rapidly changing technology. Currently India has only the IT Act, 2000 which is mainly E-Commerce legislation. India has also modified many laws to include electronic technology; however it is not sufficient to cover e-governance completely [10].

## IV. CONCLUSION

In conclusion we want to consider some of the assumptions and implications of our proposed e-Government model. A key factor to highlight here is the relationship, or lack thereof, between e-Government initiatives and access to ICTs. We see e-Government and access as separate aspects of evolving Indian ICT use. E-Government initiatives may take access characteristics into consideration, such as through the provision of service centers, rather than relying on home computer and Internet access. Actors driving e-Government may also see access as a component of the infrastructure for

developing e-Government, such as we see with the plans to provide 100,000 Common Service Centres in villages as a part of India's national e-Government plan. But it is not necessarily the case that these two aspects of ICT use be tightly linked as they develop.

Instead of the government including access development as a part of their e-Government projects, the introduction of private-sector provision of high quality e-Government services could itself encourage the private sector to promote access. The competitive nature of service provision would mean that the partner company would make more money if more people utilize the service, thereby creating incentives for access. However this may also demand that the government requires service provision in rural areas where profit levels could be lower. Ensuring broad access to e-Government services is an important piece of requirements for external providers. But it would be counter-productive if the Government mandates that its services only be available in certain designated centers, rather than anywhere on the Internet.

The relationship between services and access is also reflected in the fact that the providers of government services will have the opportunity to modify the character of their services to meet changes in access levels and types of access. For example, given limited access to computers, but much higher access to mobile phones in India, it is possible that providers will develop service applications for mobile, rather than computer, access. Individuals might be able to go to a shared access service center for initial services, particularly those requiring significant data entry, and then follow-up on these services using mobile phone applications that provide immediate access to their application status with no data reentry required.



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