

A Disability–Aware Mentality to Information Systems Design and Development

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INTRODUCTION

Nowadays, it is difficult to imagine a world without technology. We interact with technology every day in various ways. This inevitable modern technological revolution has meant that many services are increasingly being offered online. Amongst these services e-learning, e-commerce and e-health are most common. With the drive to use technology for delivering services online, a lot of the technological developments around these areas by default have often focused on meeting the needs of people without disabilities, thus leaving people with disabilities to seek appropriate assistive technologies in order to interact with such systems. In some cases, such assistive technologies might not be compatible with these systems. There are legislations in various countries around the world necessitating that people with disabilities be included in services that are offered, by ensuring that these services are accessible to them; otherwise “reasonable adjustments” or “reasonable accommodation” need to be made in order to meet their needs.

A lot of the difficulties people with disabilities face when interacting with most information systems are related to the lack of consideration of the needs of people with disabilities during the development cycle. In designing technological solutions, designers and developers need to understand that disability could affect different functions related to the senses and how this happens. Such designers need to develop a new mind set when it comes to designing systems that will be used by everyone. The difficulties and failures of

existing information systems towards people with disabilities have necessitated the search for a better approach for designing and developing information systems. Thus, this article aims to propose a disability-aware approach to information systems design and development in order to ensure that adequate analysis of the needs of potential users with disabilities is carried out and that their needs are incorporated into the design. It also ensures that a representative group of people are selected and involved in the design process. That way, useful feedback is obtained and cost of production is reduced as designers do not have to spend a lot of money retrofitting accessibility. By developing a disability-aware mentality to systems design, the result is an accessible and usable product.

In the following sections, the difficulties that people with disabilities face when using technology will be discussed through a review of literature. The disability-aware approach to information systems design will then be proposed. The recommendations from students with disabilities on how to design e-learning to meet their needs will then be presented after which future research will be discussed, before a conclusion of this article.

BACKGROUND

In order to set the scene for proposing a disability-aware mentality to information systems design and development, this section reviews literature relating to the difficulties that people with disabilities face while interacting with information systems, some assistive technologies for interacting with

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information systems and also reviews some approaches used in designing information systems.

Difficulties Encountered by People With Disabilities When Using Information Systems

It is a fact that people with disabilities are generally more disadvantaged than those without disabilities when accessing services for various reasons which could include the way the environment has been designed to accommodate their needs or how society responds to their needs in various ways. Environmental factors such as the weather, specifically during winter where there have been heavy snowfalls for instance have been barriers to people with wheelchairs accessing community services (Ripat, Brown, & Ethans, 2015). The way society is designed tends to favor people without disabilities. Thus, it is common even nowadays to see newer buildings being designed without accessibility in mind (e.g. no ramps or elevators for wheelchair access). Nevertheless, there is an increase in awareness of the needs of people with disabilities when constructing buildings, perhaps because it is mandated by disability legislations. Also, many older buildings are being adapted to meet the needs of people with disabilities, such as adding ramps for wheelchair access, including induction loops in meeting halls, controlling the lighting of buildings to suit people with light sensitivity and many other adaptations. Steyaert (2005) observed that such accessibility principles are not necessarily being translated from the physical environment into the electronic environment, leading to numerous difficulties for learners with disabilities, when considering an educational environment.

The severity of disabilities such as visual impairment may range from low vision to complete blindness. In the latter case, medical interventions such as eyeglasses, contact lenses or even surgery might not result in a permanent solution. People with this severity level will have to employ assistive technologies such as screen readers in order to

read information that is found in electronic format or through the use of digital Braille amongst other interaction methods. In education, students with visual impairments are often more disadvantaged than students with other disabilities when using technology (Kelly & Smith, 2008). There is no wonder therefore why a lot of the guidelines for designing inclusive solutions tend to use this group of people as example when discussing accessibility. For people with visual impairments to use web-based information systems many accessibility considerations, including the need to include alternative texts in images (Nganji, Brayshaw, & Tompsett, 2013) need to be adhered to. As visual impairment affects the sense of sight, if information systems are not designed accessibly with the needs of such users in mind, the result will be significant difficulties trying to interact with such systems which in extreme cases could also lead to incompatibility with assistive technologies such as screen readers. For people with low vision who do not necessarily have to rely on screen readers to read text on an information system, there is great need to ensure that they can be able to manipulate the text through increasing its size for more visibility in addition to providing responsive design.

Dyslexia is the most common disability affecting learning, particularly reading. It affects word recognition and spelling in an individual. There are a number of assistive technologies that could help students with dyslexia. Tools such as Read&Write help with writing and spelling. The amount of information that is presented in an information system as well as how the information is presented could determine if an individual with dyslexia would understand the information. Smaller chunks of information that is clearly written could be helpful.

Individuals with hearing impairment may have partial or complete loss of hearing. Depending on the severity of the impairment, individuals may rely on hearing aid or sign language in order to understand information that is being conveyed. Thus, it is important for designers and developers

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