Web Design Requirements for Improved Web Accessibility for the Blind

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Abstract. Considerable research has been done on how to make e-learning systems accessible. But Learners in electronic and hybrid learning environments utilize many Web based systems beyond what the instructor and institution provides and can control such as search engines, news portals and research databases. This paper presents Web design requirements that can improve the accessibility of such websites for PWDs particularly the blind. The requirements were derived from both theoretical and quantitative data gathered from both literature and a case study. It was observed that graphical user interfaces, non-linear navigation, forms, tables, images, lack of key board support, non-standard document formats and acronyms and abbreviations hinder Web accessibility for the blind. Therefore in order to improve Web accessibility for the blind, the following requirements were suggested; a text only version of the website or a combination of design considerations namely: text alternatives for visual elements, meaningful content structure in the source code, skip navigation link(s), orientation during navigation, ensure (tables, frames and forms) are accessible if any is used, test the website with keyboard only access, use or convert documents into standard formats and expand abbreviations and acronyms the first time they appear on a page. Meeting the given requirements in the Web development process improves Web accessibility for all blind Web users including those engaged in hybrid learning.

Keywords: Web Accessibility, Requirements, Blind, Hybrid Learning, E-learning.

1 Introduction

With the Web, People with Disabilities (PWDs) can undertake a number of tasks that would otherwise be difficult or impossible. Learners with visual, audio, cognitive, learning and physical disabilities can take all or most of the courses in the comfort of their homes. They can access course content online, interact with the instructor, participate in online discussions with classmates, research on the subject, buy books/ software and read news including that related to class modules. However this is only possible when designers of such systems consider their special access needs. Considerable research has been done on how to make e-learning systems accessible [1], [2],

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[3], [4]. This has resulted into systems like VisiCAST [5], SMILE [6] and the EVIDENT [7] which are trying to address the need for accessible learning materials for PWDs. But learners utilize many other Web systems during their learning experience beyond what the instructor and institution provide and can control. They use search engines and research databases for additional study material, buy books/software online, access news portals for articles on class modules and may need to interact with classmates and other learner groups on social networking sites like Facebook [8]. Besides educational needs, the Web offers opportunities for all PWDs to do more things themselves without external support. They can shop, read news and pay their bills online among other things.

This paper provides Web design requirements that can improve accessibility of websites such as search engines, e-commerce sites, news and general portals for PWDs particularly the blind. The requirements are based on both theoretical and quantitative data gathered from literature and a case study involving blind and sighted Web users on sample websites. Meeting the given requirements in the Web development process improves Web accessibility for blind Web users such as those engaged in hybrid learning. Other than PWDs, accessible websites offer other benefits to other users and owners namely: better page download speed, easier to use for all, easier maintenance and upgrade and better visibility for search engine indexing [10]. The remainder of the paper has methods, results, discussion of the results, Web accessibility requirements for the blind, conclusion and future work.

2 Methods

The objective of this work was to establish the Web accessibility requirements of blind Web users. This was achieved by reviewing the major guidelines, policies and published literature on Web accessibility for PWDs particularly the blind and a case study involving blind and sighted Web users. The case study was used to verify if the requirements given in the guidelines and literature were correct, complete or otherwise. The case study involved blind and sighted Web users who performed tasks on five sample websites covering common Web applications: search engines, news portals, e-commerce and a tourism portal. Each website had one or more of the features reported in literature to hamper accessibility for the blind. Features not found in the sample websites or that could not be sufficiently assessed using the sample websites were tested by the researchers using Job Accessibility with Speech (JAWS) 8.0 screen reader. A website designed to be accessible to PWDs was included in the sample to compare its usability with others. Only participants with intermediate web usage skills and above were involved in order to minimize expertise related other than visual disability related problems with the tasks. The tasks and associated questions made participants interact with the website features reported to affect Web accessibility such as graphical user interfaces (GUIs), forms and tables.

Participants were required to open sample websites, perform specified tasks, give feedback about the results and any problems encountered. The questionnaire was e-mailed to 10 participants on 1st July 2007 to be returned by 30th July 2007. Five of the participants were university students and the rest were working class. We fell short of our target sample of 20 blind Web users because blind people that could use