Courseware Accessibility: Recommendations for Inclusive Design

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Abstract

Providing educational opportunities within online environments, while beneficial, also has the potential to exclude a significant portion of the population. The learning and/or physically disabled may be prevented from accessing online learning environments due to problems both in the design of the technology itself, and with the pedagogy directing the use of this technology. This paper presents an overview of the results of research into courseware accessibility. Recommendations for inclusive design are presented within disability-specific requirements for accessible courseware.

People with learning and/or physical disabilities may be prevented from accessing online learning environments. There are problems in the design of the technology itself, as well as with the pedagogy directing its use. Inclusion in an Electronic Classroom [1], a study funded by the Office of Learning Technology and conducted at the University of Toronto’s Adaptive Technology Resource Centre, recently examined accessibility within various courseware platforms in order to better assess the limitations faced by persons with disabilities using online learning environments. The study focused on eight individuals from the following disability groups: Blind, Vision Impaired, Mobility Impaired, and Learning Disabled, and encompassed both experienced and inexperienced users. The study is a joint initiative of the Adaptive Technology Resource Centre at the University of Toronto, The Centre for Academic Technology at the University of Toronto, the Special Needs Opportunity Windows Project at the University of Toronto, the Learning Disabilities Association of Ontario, the Canadian National Institute for the Blind and Dr. Bruce Landon. Results indicate that courseware environments need to consider problems in the design of the technology itself, as well as with the pedagogy directing its use.

Accessibility Issues by Disability Group

Blind

Java-based technologies such as chat rooms, whiteboards, and progress displays are inaccessible to users who cannot use the mouse and are reliant on the keyboard. This also extends to "Browse" buttons (for file uploads) that are not properly programmed, as well as poorly labeled form elements. Inconsistencies in layout and in language used to describe functions and features can result in confusion around how to accomplish tasks. Users who rely on screen readers have problems with multiple frames and nested tables, given that screen readers generally read across a screen and cannot differentiate between text in columns. Frames that are either unlabelled or improperly labeled also present complications for blind users as regards the specific function of each frame (navigation, content, etc.). In addition, surprise popup windows can confuse screen readers with respect to matters of their function, as it may not be clear why the window has opened, and how the window contents relate to the rest of the site.

Low Vision

People with low vision experience problems similar to those experienced by blind users. However, due to the fact that these users can fall back on residual vision, these complications can be less confusing in some instances. As with blind users, problems with the adaptive technology itself can create accessibility issues, although users may more easily overcome these given more experience with both the adaptive technologies and online learning environments. One low vision participant in this study experienced problems resulting from (or exacerbated by) limited experience with web navigation and courseware environments in general, inexperience with the adaptive technology, and general assumptions and preconceptions of online learning. Problems experienced by the other low vision participant were inherent to the courseware itself, including the illogical display of steps required for task completion, and confusing and ambiguous use of terminology.

Learning Disabled

Problems encountered by learning disabled participants were largely a result of inconsistencies in layout and in the
language used to explain task requirements, the absence of alternative information formats, and the absence of instructions for multi-step activities. Learning disabled participants faced problems related to inexperience with online learning environments and difficulties related specifically to their respective disability. However, problems with absent or incomplete instructions coupled with assumptions of online skills and ability exacerbated these difficulties. The latter problems can and should be addressed by courseware manufacturers (by making adequate and complete instructions available on demand) and by course developers/instructors. Course developers should create an inclusive environment for learning that includes provisions made for people who need these instructions as well as the redundant display of key information.

**Mobility Impaired**

The mobility impaired study participant (a quadriplegic) experienced no difficulties in accessing each courseware function. This was largely a result of this participant’s familiarity with both adaptive technology and online instructional environments. The only problems experienced by this participant related to specific courseware functions that were not operational.

**Recommendations for Inclusive Design**

The major obstacles to accessibility are complexities in page layouts, inconsistencies in item labelling, a lack of instructions for task completion and the absence of consistent and clear functions related to items within courseware platforms. To ensure full accessibility of information, courseware developers need to ensure their platforms conform to the current WAI guidelines [2]. Redundant information display is needed to aid those who are learning disabled. In addition, problems with courseware platforms and adaptive or assistive technology need to be acknowledged, addressed and tested to lessen the effects of incompatibilities. The courseware environments studied in *Inclusion in an Electronic Classroom* failed on several accounts to comply with the WAI guidelines, including the generation of inaccessible content by automated markup tools [3].

Separating the media used to access educational material from the content puts the emphasis on content flexibility; it must fit a variety of presentation media (text, audio, etc.). New mark-up languages (XML, XSL, CSS, DOM, XUL, Java) “separate content and structure from presentation” and “separate function from input [and output] method” [4]. This allows people who need alternative or redundant output devices to access media that may otherwise be inaccessible to them. Future courseware applications should strive to include the option of coding in these modalities. “The transformative power of computers makes most of this information available for the first time to many people with disabilities” because digital media can be adapted to multiple outputs [4]. Technical considerations aside, the most important obstacle to accessibility is effective pedagogical deployment of the technology in educational contexts.

Course instructors using online learning technology must be aware of both pedagogy and accessibility issues and how the platform being used might fail to meet these standards. Technical faults can be worked around, although this can be costly, time consuming, and frustrating for all concerned. The need for built-in accessibility in the tools facilitating online learning must be prioritized. It is also imperative to provide adequate and comprehensive instructions for the use of the actual courseware, as well as dedicated institutional support for both instructors and end users.

Just as buildings are built with accessibility factored in from the ground up, so too must WWW and Internet architecture factor in accessibility initiatives from the outset to ensure equitable access to online resources. Ensuring accessibility encourages people with physical and/or learning disabilities to become producers of information, instead of remaining passive consumers. Accessibility in online course designs will ensure that the wider population benefits from these programs: “For people without disabilities, technology makes things convenient; for people with disabilities, it makes things possible” [4]. Accessible online programs offer disabled persons an avenue to pursue educational options where none might have existed before. By making information more accessible to all, everyone benefits [5]. It is imperative to ensure the accessible design of all web materials from their first iteration.

**References**