

## **Distance, Disability and the Commodification of Education: Web accessibility and the construction of knowledge**

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### **Abstract**

The uses of Internet technology within educational settings reflect particular perspectives on a host of issues including ability, race, and learning styles, but are often not examined for their implicit ideological or epistemological foundations. Web accessibility (ensuring that web content is accessible to persons with disabilities), though laden with progressive intent, is increasingly connected to neo-liberal agendas within higher education. The delivery of instruction online, and the increased use of technology in all modes of instruction positions teachers and learners within particular discursive formations and mediates instruction in ways that privilege certain epistemologies. In the present article the concept of articulation is utilized to make sense of the diverse ideological and philosophical perspectives that find a nexus in web accessibility and that are analyzed vis-à-vis the increasing technologizing of instruction. As part of this analysis, distance education technology and web accessibility standards are discussed and the notion of "marketizing" disability is explored within the context of shifts toward online instruction.

### **Introduction**

The increased use of technology in colleges and universities is fairly obvious to even the casual observer, but its integration into educational practice is changing both the fabric of distance education and traditional in-person, on campus course offerings. This change affects the ways students and teachers interact as well as the ways in which knowledge is constructed, pedagogies enacted, and certain types of knowledge are privileged.

In addition to the mediation of instruction and the effects on teaching and learning directly attributable to technology (e.g. the disruption of the constraints of time and physical location), the evolution of technology in on-campus and distance education courses has the potential to exclude groups of students and faculty on the basis of disability. This exclusion emerges in a physical/material form - that of basic access to course materials bound up in technologies that are not usable for individuals with disabilities. It also emerges in a philosophical/ideological form in which understandings of disability both within the technology and its utilization are predicated on certain understandings of disability that preclude the full participation of all students. What makes web accessibility a particularly interesting issue is that it can be found at the confluence of several seemingly disparate forces within the university. Understanding the context of this confluence provides insight into the ways in which technology, in particular those used in distance education mediate the construction of knowledge.

It is important to note that the implications for this discussion are not limited to those students or faculty with disabilities because the forms of instruction and policy bases touch all aspects of web-based distance education and an increasing number of the components of "traditional" instruction (e.g. face-to-face, on-campus courses).

Furthermore, in the context of educational reform and budgetary crisis, web accessibility plays a complex role in efforts toward moving instruction online.

This paper looks at a host of issues revolving around web-based distance education and web accessibility including the epistemological perspectives from which much Internet based distance education is constructed, the articulation of divergent interests around the concept of web accessibility, and the marketization of both disability and university courses. I begin by offering an overview of common distance education technologies currently used in higher education and a brief discussion of the two main bodies of standards intended to guide the development of web content accessible to the broadest possible audience. Next, I use the analytical concept of articulation to explore the political and practical aspects of web accessibility and the conceptualization and implementation of related policy. Of particular interest is how divergent ideological interests utilize the issue of web accessibility to mobilize other agendas. Building on the discussion of articulation, I discuss web accessibility and the marketizing of instruction with its attendant issues for instructors and students. I conclude by considering some of the ways in which distance education trends and particular understandings of learning privilege certain types of knowledge over others.

### **Distance Education Technologies and Web Accessibility**

In order to get a sense of the context of this discussion, a clarification of the terms "distance learning" and "accessibility" is appropriate. Within these descriptors is an overlapping set of practices that are often viewed as synonymous and are often used interchangeably. Each term has its own distinct history and significance that have lately intersected important ways. The intent here is not to fully explore these concepts but to generate a working definition of these ideas for use here.

### **Prevalent distance education technologies**

Email and the World Wide Web (WWW) make up the two central components of the Internet that are being used in education today. However, a growing number of programs are making use of applications called courseware<sup>1</sup> or coursemanagement software (CMS) that automate communication between faculty and student, the delivery of course materials and assessment. WebCT and BlackBoard are two well-known examples of courseware. Together with email and the WWW, these programs are stretching the definition of distance learning to include some more traditional university functions.

Distance learning is neither a new nor a particularly uncommon form of education. It has previously used the postal service, radio and television as a means of communicating between teacher and student (Sumner, 2000), but Internet based distance learning has the potential to constitute something entirely different. The speed with which participants communicate, the distances between participants, and the multi-directional nature of those conversations stand in sharp contrast to previous methods of distance education. This updated retooling of distance education often carries with it the cachet of progress and the promise of reform - as well as the multitude of meanings that accompany them.

Yet understanding what constitutes distance education is no easy task as these tools seep into courses offered on campus and courses both for educational and administrative purposes. Techniques previously reserved for distance models are increasingly commonplace in the traditional mode of higher education and the lines between traditional and distance education begin to blur. Where once distance learning was truly the delivery of instruction between separate physical spaces, this new incarnation is based on the delivery of curriculum via the Internet by placing entire programs online. Distance education was once focused on the physical separation between teacher and student; today it refers to the tools by which instruction is mediated. The Internet has tremendous abilities to deliver instruction over great distances. It also has tremendous power to mediate the construction and re-construction of knowledge, automating and narrowing instruction (and curricula) by defining and prescribing particular pedagogic methods inscribed by particular philosophical and theoretical conceptions of teaching and learning. For example, the testing features in WebCT emphasize objective testing and timed performance.

Additionally, distance-learning technologies via the Internet construct (and re-construct) both the teacher and learner within particular discourses of power that often exist tacitly in particular technology forms. For example WebCT structures interaction between teacher and learner in ways that are determined by the design and process of the technology. It is important to note that this is not a natural consequence of the integration of the Internet into education, but an artifact of the policies and practices that surround its use. This comprehensive view of the integration of the Internet into instruction is the basis for a broader definition of distance learning in order to better understand how these tools affect instruction. At the same time understanding the epistemologies that structure the development of these tools can offer insight into how learning at a distance may become more collaborative and less potentially oppressive.

### **Accessibility standards**

The rapid growth of the Internet has changed the ways people communicate, teach and learn, while at the same time increasing the isolation of those who do not have access to these technologies. Over 20.9 million Americans aged 15 years and over have an identified work disability (Kaye, 2000). An additional four million children of school age have a chronic physical or mental health condition that limits their full participation in "mainstream" educational activities (Wenger, Kaye, & LaPlante, 1996).

The goal of accessibility standards is to help make the web more accessible for people with disabilities. This includes individuals with visual disabilities, hearing disabilities, physical disabilities and cognitive or neurological disabilities. Accessibility standards help web designers identify and address accessibility issues.

The World Wide Web Consortium<sup>2</sup> or W3C leads what is perhaps the most comprehensive web accessibility standards initiative. The W3C's Web Content Accessibility Guidelines<sup>3</sup> (WCAG) were the first major effort to establish guidelines for design. This standard consists of 14 guidelines, each with three levels of checkpoints<sup>4</sup>. The WCAG is not a legal mandate, but rather a comprehensive set of guidelines to ensure accessibility.

In addition to the WCAG guidelines, there are emerging legal mandates for accessibility. Currently, there is no direct legal mandate for university web sites in the United States, but there is strong precedent. Indeed, many states and universities are developing their own standards based on the WCAG. In the United States, Section 508 of the Federal Rehabilitation Act<sup>5</sup> sets standards for web pages designed or maintained by federal agencies. Section 508 requires that electronic and information technology that is developed or purchased by the federal government is accessible by people with disabilities. Section 508 does not directly apply to the private sector. While many universities have adopted the standard outlined in Section 508 as part of their accessibility policy, they are not required to do so under the current law. However, there is widespread expectation that similar laws may be passed in the future regarding the publication of web sites in organizations that receive federal funds. Predicting future legislation is a tricky endeavor at best, though it seems inevitable that accessibility policy will be more broadly based some point in the future. Globally, the adoption of accessibility standards in Canada, the European Union, the United Kingdom, Australia, Japan, and Brazil, make this an international issue in which designers and developers face mandates to ensure that people with disabilities are able to access the contents of web sites and web applications. For example, in Canada and the United Kingdom, web site designers for the national governments are required to follow both the Priority 1 and Priority 2 checkpoints of the WCAG.

Within the disability groups outlined by the WCAG, there is a spectrum of issues and technologies. The case of individuals with visual disabilities is a good example. This group includes but is not limited to blind users, users with low or impaired visibility, as well as users with color deficits. Each group has a specific set of needs and often uses a set of tools to address those needs. For example, a blind user may use a screen reader to read the content of a web page aloud. In order for a page to be read by a screen reader, the page has to have text associated with all components of the page, including images. In contrast, another user with low visibility may need the page to be rendered in large print. Another user may be colorblind and may find pages with red-blue color combinations difficult to read.

There are a variety of methods for meeting the needs of those users whether through assistive devices such as a screen reader or through presentational standards. The WCAG guidelines attempt to reflect the requirements of as many of these users as possible. What is often lost in the policy language is that users with disabilities by no means represent a uniform category, nor can they be neatly divided into subcategories.

### **Articulation - Analyzing "Webs" of Ideology**

There are multiple contradictory subject positions, ideological formations, and processes that surround and circulate throughout the conceptualization and implementation of web accessibility practices and policies. On the one hand, there are profoundly progressive tendencies driving policies to open the doors of the university to students with disabilities and community members in ways that were not previously possible. On the other hand, web accessibility in the U.S. is linked to bureaucratic concerns such as reducing a university's legal exposure to lawsuits, maximizing use of existing technological infrastructure and broader efforts to move instruction to the web. Understanding these inter-connections is central to this analysis. The implementation of

distance learning technologies, reflects ideological and political interests structures interaction between teacher and learner, and mediates the construction of knowledge

These inter-connections and the coexistences they create are an example of an articulation - a temporary and contingent linkage between particular discursive formations and/or individuals. The concept of articulation helps us examine the complex ideological formations and understandings of disability behind such initiatives as web accessibility as ever changing and more than a necessary result of particular structures of power and policy. As Stuart Hall notes, "[an articulation] is a linkage which is not necessary, determined, absolute and essential for all time" (Grossberg, 1996). When examining web accessibility and technology as examples of articulated ideological formations and various subject positions, it is crucial to recognize that such circumstances are constantly shifting. Over time, these policies will be under pressure to continue to meet the ideological pressures of various blocs affected by them. For example, there is currently a confluence of needs for universities to provide accessible content and their desire to maximize income in difficult economic times. By ensuring accessible web-based content, universities can simultaneously broaden their markets while trimming expenses. One might be led to wonder, as material and political conditions change will this particular articulation of legal requirement and economic necessity continue to exist? Additionally, how does this particular articulation affect the provision of instruction at the university?

These articulations between legal requirement, progressive intent, and market forces occur within the broader context of reform and change within higher education. This raises questions about the role of the university in supporting improvements in technology infrastructure and the commodification of instruction. For example, the primary responsibility for the improvement of instructional web sites is often placed on the faculty themselves. At the same time, there is often little discussion of how to support these individuals within web accessibility policies themselves - policies are often unfunded mandates. Subsequently, there is serious potential for web accessibility policies to simply shift the responsibility of web accessibility to individual faculty and staff, intensifying and conflating the roles of teaching and technical production.

### **Web accessibility and marketizing instruction**

The effort to promote and create accessible web pages can also be seen as part of a larger trend within the university to move instruction to the web. This process may have benefits especially for individuals with disabilities and non-traditional students. For individuals with disabilities, distance learning offers an alternative to place-specific classes and Internet technologies offer potential for ease of use for a wider range of assistive technologies. The flexibility offered by asynchronous<sup>6</sup> Internet based learning technologies often makes courses offered via this medium appealing to students with disabilities. This updated retooling of distance education carries with it the cachet of progress and the promise of reform - as well as the multitude of meanings that accompany them.

Conversely, critics like Noble (1998) point to the dangers of courses offered online. While they often generate revenue for the cash poor university, online offerings have tremendous potential to erode faculty autonomy and job security as well as contribute to

the narrowing of the curriculum - especially by limiting instruction as constrained by technology and reinforcing particular pedagogic methods which reflect certain understandings of learning.

The courseware tool WebCT provides an interesting example of both attempts to accommodate the accessibility standards while simultaneously marketizing disability and commodifying instruction. WebCT and tools like it reflect the conditions necessitated by diverse interests including movements to standardize instruction, efforts to move instruction to the web, and web accessibility initiatives. The actual accessibility of WebCT as a tool is increasingly less an issue than it has previously been. As a company, WebCT at least recognizes that the issue exists<sup>7</sup> (WebCT Accessibility, 2003), but the confluence of needs and interests that are simultaneously engaged with and served by web accessibility policies finds a nexus in CMS tools like WebCT.

The connection between Internet based distance learning and the bureaucratic and ideological agendas within the university is central to this understanding of Internet based distance education tools, web accessibility, and the construction/valorization of particular forms of knowledge. In reference to a slightly different context, it has been aptly noted that "teacher development, cooperation and 'empowerment' may be the talk, but centralization, standardization and rationalization may be the strongest tendencies" (Apple & Jungck, 1998, p133). In its application, Internet based distance learning is most often deployed in exactly this manner. Internet based distance learning offers a new revenue stream to the university, its reusability facilitates standardization, and the development of offerings can de-professionalize the professoriate. Often courses are "developed" by tenure track faculty only to be delivered routinely by adjunct instructors or part time instructors in a gradual process of standardization and deskilling. When the content of the curriculum is constructed independently of the instructor, its content and perspective are easier to control and more reliably delivered to students. At the same time, a standardized curriculum makes fewer demands intellectually on the professor. Hence, the university may employ less qualified, and subsequently, less expensive faculty. Additionally, the consequences of these processes are significant in terms of curricular standardization.

### **The quasi-market**

Internet based distance learning tools are often used as ways to market university education to larger markets. In addition to being appealing for individuals with disabilities, these courses are also cast as appealing more directly to the lifestyles of non-traditional students. Consider the following quote from a student in a distance education program brochure at a large state university:

Working full-time and being a single parent does not leave me much time for attending classes on campus. Through distance education, I can balance the demands of my job and time with my two daughters. Without distance education, I would not be able to finish my degree.

Courses delivered via the Internet offer flexibility around full-time jobs and family obligations. This logic of appealing to non-traditional students in higher education can be seen as part of the marketizing logic of devolution. In the most general sense,

devolution describes a process of decentralization. Post-secondary institutions in the U.S. have long had a degree of relative autonomy from central bureaucracies with respect to issues of curriculum, teaching and admissions. The use of popular distance education technologies, ostensibly for providing instruction in as cost-effective a manner as possible, centralize and format curricula for particular markets thereby shaping the form of instruction to reflect (perhaps unwittingly) particular epistemological approaches to teaching and learning.

Within higher education, decentralization coupled with a competitive market for students via Internet technologies results in a quasi-market. The characteristics of a quasi-market include the separation of purchaser and provider and elements of user choice among service providers so that, "provision of a service is separated from its finance, so that different providers, including sometimes private and voluntary sector bodies, can compete to deliver the service" (Whitty, Power, & Halpin, 1998, p.3).

In the United States, higher education functions as a quasi-market in its separation of funding from the provision of service. As in the primary/secondary school environment, higher education is a regulated market. Its governance is often a complex blend of state education systems, private accrediting associations, and federal support through student loans and other initiatives. Without proper accreditation from approved private associations university students are not eligible for federally backed financial aid loans (Blumenstyk, 1999). Additionally, the states wield (increasingly) powerful influence over public universities through legislation and budgetary control.

Ball (1997) argues that devolution is more than a structural transformation, but a replacement of, "the Fordist discourse of productivity and planning with a post-Fordist rhetoric of flexibility and entrepreneurialism (p.258)." The post fordist notions of flexibility and entrepreneurialism are central to the marketizing forces behind initiatives to place instruction online and "encourage" professors to generate online instruction. Thus there is not only a transformation of the university through the growing relevance of Internet based distance learning, but a also a change in the university student and professor as the context in which they engage the curriculum as and each other changes.

For American universities, these transformations have occurred at least in two ways. Internet based distance learning have diminished space and time limitations that existed earlier. Universities that once enjoyed a relative monopoly within a geographic region must now compete for students from around the world. For example, teachers in a particular state who are seeking advanced degrees and certification need not necessarily attend the local campus of their state's university system. Instead, they may choose from a variety of new programs on-line, such as Walden University or Cappella University, or an online program from a competing state institution. They may also choose to participate in new programs at traditional universities that offer limited time in residence in conjunction with correspondence work done online.

A second transformation is what has been called, "exporting the crisis" (Whitty et al., 1998). As in other areas of publicly provided services, neo-liberal reform of education has removed or changed intermediary layers of administration between individual institutions and the state. This shift has transferred the responsibility for administrative

functions traditionally managed by the state onto individual institutions. At the same time, these administrative functions must be delivered from the same pool of funds previously available. Subsequently, university administrators are under increasing pressure to find new sources of revenue (e.g. grants) to support their programs. While state legislators and governors, as well as federal leaders use the language of autonomy and market accountability, they maintain strong regulatory power over higher education. In some instances, this has served to further muddy the water with regards to accessibility. Important and sometimes impasse-creating questions about funding accessibility initiatives emerge when unfunded mandates are made.

Given the stakes surrounding online education, accessibility policy becomes an important component service provision and market control. There is however an interesting paradox. Because disability exists on a continuum, that is, because no one experiences disability the same and because the range and effects of disability vary, the responses to accessibility vis-à-vis marketing distance education also vary. A student who has chemical sensitivity and cannot attend classes on a physical campus but has no other physical or cognitive disabilities, makes a good case for moving an entire degree program online. Conversely, a deaf student who normally takes courses on campus, but is taking a course that uses video delivered over the web presents a financial challenge when pre-produced video must be captioned. Thus the ways disability is understood and attitudes toward disability affect the development and utilization of instructional technologies that mediate instruction and position learners. It is within the context of devolved and quasi-markets that making web-based courses accessible to individuals with disabilities becomes either another marketing device or a financial liability.

### **Designing Instruction - Constructing Knowledge**

In addition to the demands on professors to develop courses, often professors are employed as "content experts" in the development of online course offerings. At the college and university level, most web-delivered course content is heavily influenced by professional instructional technologists and web developers given the limited time and technical expertise of teaching faculty. In general, the field of instructional technology has not incorporated a developed critical and sociocultural language into its discourse. There have been isolated attempts to bring issues of culture and production of knowledge to the forefront, but they have been sparse and infrequent (e.g. DeVaney, 1998; Hlynka & Belland, 1991; Streibel, 1986; Streibel, 1998). This results in a good deal of instructional technology work and research that considers technology as "immune" from ideology, and which takes up identity as a static construct; not considering the fluid and socially constructed aspects of identity so mediated by information technology. Subsequently, educational technologists often do not consider how the ways in which they use technology or the assumptions they make about individuals and technology position people within particular and often inflexible subject positions. These views of technology and identity as ideology-free impact the instructional tools that instructional designers construct for diverse populations including considerations for acculturation, ethnicity, educational media design, proficiency, or culturally specific learning strategies. For example, "objective" statements about ability and disability position people within particular and often inflexible subject positions that are neither value neutral nor often accurate (Charlton, 1998). Furthermore, conceptualizations of disability are not static. What is considered a disability changes in different social and historical

contexts (e.g. Foucault, 1988). There have been significant strides in theorizing the conceptualization of disability that move beyond highly medicalized, deficit-based understanding of persons with disabilities toward a "social model" of disability that contends that disability is a social status resulting from cultural values and practices that stigmatize, marginalize, and oppress disabled people (e.g. Erevelles, 2000; Peters, 1995; Pugach & Seidl, 1998; Ware, 2001). Unfortunately, the vast majority of educators and policy makers still conceptualize disability according to dated models that tend to view disability as a medical condition - a deficit in the person with the disability (i.e., as "sick," or "not normal") (Pfeiffer, 2002). Thus, discourse in instructional design discourses construct disability as something that must be identified discretely and accommodated.

Noting the lack of understanding of difference and the articulation of divergent interests in the deployment of instructional technology underscores the complex and contradictory role Internet based distance education plays in the ways instruction is delivered and which epistemologies undergird the development of both technologies and online educational processes.

The process by which curricula delivered via Internet based distance learning is standardized may be seen as a partial consequence of the limits of the technology itself. Access to a sufficient number of computers, the computing power they represent, the bandwidth available to those machines, and compliance with accessibility standards within various technologies all serve as constraints on the nature and form of the content delivered over them. For example, the use of video online is limited by the requirements it places on networks and individual computers. High quality video requires large amounts of disk space and fast Internet connections. Additionally, video presents several obstacles for users with disabilities. Video is often not captioned (for users with hearing impairments), video is often presented in low-quality and small window sizes (issues for users with visual impairments), and often video, especially streamed video, is difficult to start, stop, and search (issues for users with cognitive disabilities). Further limits are placed on curriculum by the technical knowledge and time required in the production of curriculum materials. This includes the ability to make a web page, use courseware, create video and do it all in a manner that meets accessibility standards. Even more limits arise in the ways in which user access to content is constructed. Individuals using assistive technology<sup>8</sup> (AT), older computers, and even different platforms experience the environment differently and have varying levels of access. This can have profound effects on the nature of the work possible under these circumstances.

It is important to point out some concrete ways in which technology determines the form and content of the curriculum, as well as our interaction with it. These limitations within the technology are a reflection of the values of those who design, implement and maintain computer networks and software. For example, the decision to include multiple choice assessment tools into the WebCT courseware package was made on a very specific set of beliefs about teaching practices in higher education (or perhaps in ignorance of others). This decision almost certainly reflects certain understandings or misunderstandings of ability and difference.

Disability, courseware, and other Internet based learning technologies also provide a vantage point from which to observe other competing interests in higher education. It is

in this sense that disability and efforts to make web content accessible become part of a larger struggle involving bureaucratic and market-based issues. As a bureaucratic issue, the development and implementation of web accessibility policies shield institutions from liability when courses and other web content are not accessible. Similarly, the push for web accessibility also becomes a strange bedfellow with other interests in the university that wish to optimize instruction, broaden market bases, and minimize expenses (Internet based forms of distance education are largely considered to be cost-efficient, especially when the same course is repeatedly delivered to large groups). Thus the progressive aspects of web accessibility initiatives and disability advocacy become articulated to elements of market-based and neo-liberal reform within higher education. This confluence of these disparate interests presents some interesting challenges, particularly for those viewing accessibility as a social justice or political issue. The advocacy for accessibility becomes advocacy for implementation of technology programs that might have other less-progressive implications.

### **Conclusion**

Understanding what constitutes distance education is no easy task as Internet based distance education tools seep into the more traditional forms of education. Techniques previously reserved for distance models are increasingly commonplace in the traditional mode of higher education (e.g. online asynchronous discussion) and the lines between traditional and distance based education begin to blur (i.e. the use of courseware in classes that also meet face-to-face). Where once distance learning was truly based on the delivery of instruction between separate physical spaces, current forms of distance instruction are based on the delivery of curriculum via the Internet and the distance is more often temporal rather than spatial. Distance-learning technologies via the Internet construct (and re-construct) both the teacher and learner within particular discourses of power. Within the complex and contradictory subject positions, ideological formations, and processes that surround and circulate throughout the conceptualization and implementation of web accessibility practices and policies. The concept of articulation provides a footing for understanding the complex ideological formations behind distance learning programs and understandings of disability and as ever changing and more than a necessary result of particular structures of power and policy.

### **Notes**

1. Courseware, a term resulting from the combination of the words course and software, is often broadly defined as prepackaged computer based educational materials in which the computer mediates the educational experience. I use the term fairly specifically to refer to such software suites as WebCT, BlackBoard and the like which facilitate computer-based distance education via the Internet.
2. The W3C is the organization responsible for the standardization of a wide variety of web related technologies such as Hypertext Markup Language (HTML). The W3C also coordinates a project known as the Web Accessibility Initiative (WAI). This ongoing initiative consists of several projects including publishing a set of standards for web content, another set of standards for software used to create web pages as

well as a set of standards for browsers used to view web content. URL:  
<http://www.w3.org/>

3. <http://www.w3.org/TR/WCAG10>
4. Priority One checkpoints are those that the web developer must satisfy to insure that the page itself is accessible. Priority Two checkpoints are those that the web developer should satisfy to ensure that certain groups will be able to access information on the web page. Priority Three checkpoints are those the web developer may do to ensure that all content on the page is completely accessible.
5. The regulations referred to as Section 508 are actually an amendment to the Workforce Rehabilitation Act of 1973.
6. Asynchronous discussions allow users to send and receive messages without a simultaneous connection. These are more commonly called bulletin boards. Synchronous discussion is a real time conversation where participants are online simultaneously. These areas are often referred to as chat rooms.
7. An interesting point to make regarding WebCT and accessibility should be made though. While WebCT claims its product is accessible, it does not ensure that all content delivered via WebCT is accessible. For example, a professor might place content in WebCT in an inaccessible format such as a PDF file containing a scanned image of handwritten notes. Thus WebCT's claims cannot be taken as definitive accessibility and the issue of individual faculty accountability is raised.
8. Assistive Technology is specialized hardware and software tools individuals with disabilities frequently rely on to access web content. These tools range from screen readers to touch screens and head pointers. Blind users frequently use software called a screen reader that reads the contents of a web page out loud. Screen readers enable users to hear, rather than view, the contents of a web page; however, a screen reader can read only text, not images or animations. Users with impaired mobility may rely on the keyboard instead of the mouse to navigate web pages.

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