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Beyond legal compliance: Communities of advocacy that support accessible online learning

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Abstract

The promise of social inclusion, reinforced by online technologies, has not become the reality for most people with disabilities. In 2002, over 10 years after the implementation of the Americans with Disabilities Act (ADA), more people with disabilities were unemployed than at any time in the last 30 years. Most online educational environments are still not accessible to students with disabilities or those using assistive technologies. While enrollment of people with disabilities in colleges and universities has increased, few have been able to graduate, find successful employment, and move on to independent lifestyles, free of government assistance.

This paper discusses the progress towards accessible online education by summarizing the impact that accessibility case law has had on reaching accessibility goals in education and employment and evaluating alternate approaches to defining and reaching accessibility in online education.

Keywords: Online learning environments; Americans with Disability Act; ADA; Accessibility; Universal usability; Universal design; Assistive technology; Disabled Student Services

1. Introduction

Technological development, at the end of the 20th century, held great promise for people with disabilities (Kaye, 2000a,b; Ritchie & Blanch, 2003). Without leaving their homes, people with disabilities would have the potential to vote in community elections, fulfill civic responsibilities on juries and other public commissions, complete college degrees and vocational education programs, and

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competitively perform the essential functions of more challenging, better paying jobs. Access to higher education and full employment possibilities would be enforced through legislation, such as the Americans with Disabilities Act (ADA). For the first time, a person's capabilities would be defined by what he/she could do instead of what he/she could not do. Universally accessible environments would replace barriers preventing people from competing equally for employment and professional recognition. The growth of the Internet and the possibility of completing online college degrees and vocational programs would expand the promise of reaching social inclusion by eliminating inequities in educational opportunities due to limited physical access to buildings, transportation to campuses, or the inaccessibility of textbooks, videos, and other learning materials (First & Hart, 2002; Wall & Sarver, 2003).

However, the promise of social inclusion, reinforced by online technologies, has not become the reality for most people with disabilities (Kruse & Schur, 2003; Lee, 2003). In 2002, over 10 years after the implementation of the ADA, more people with disabilities are unemployed than at any time in the last 30 years. Most online educational environments are still not accessible to students with disabilities or those using assistive technologies (Bray, Flowers, Smith, & Algozzine, 2003; First & Hart, 2002). While enrollment of people with disabilities in colleges and universities has increased, few have been able to graduate, find successful employment, and move on to independent lifestyles, free of government assistance. This paper will discuss the progress towards accessible online education by summarizing the impact that accessibility case law has had on reaching accessibility goals in education and employment and evaluating alternate approaches to defining and reaching accessibility in online education.

Attainment of equal civil rights, employment opportunities, and the American dream of economic security have long been associated with educational advancement and the completion of college degrees or technical vocational programs (First & Hart, 2002). Internationally, educators have recognized that one of the goals of education is to educate people to become competent citizens that can contribute to their communities by being productive workers, informed voters, and compassionate neighbors (Association of International Educators [NAFSA], 2003). It is increasingly becoming more important to have access to, and the capability of, using technology and the Internet to be a productive citizen. Voting, banking, and rapid communications through e-mail, faxing, and information retrieval is linked to one's ability to use online technologies (First & Hart, 2002).

Federal and state legislation promoting social inclusion of people with disabilities is often focused on access and success in schools and universities (Frieden, 2003; Levy, 2001). This focus creates enormous pressures on educational systems to prepare students with disabilities to be effective community members by being able to use technology, complete educational goals, and compete equally for employment. People with disabilities often necessitate the use of assistive or adaptive technologies to access and use computers, requiring additional technology training to use them well (Scherer, 2002). Without this additional training and support, the student's frustration often leads to the rejection of the technology and academic failure for the student. Equally important as access for students to educational opportunities is the access of faculty and school staff with disabilities to employment opportunities in educational environments (Abram, 2003). Universities also must comply with legislation allowing all qualified people to compete for teaching and educational support services employment opportunities without fear of being denied these jobs because of access to needed technology.

Discourse concerning accessibility of the Web and online learning environments is often constructed around the understanding and compliance with legal requirements (First & Hart, 2002; Lee, 2003). This approach is reasonable to professionals in the field of engineering rehabilitation, computer design, law,

business administration, and educational administration because planning and quality assurance are also organized around preset guidelines and measurable standards. Yet, these laws and professional standards alone have not been able to resolve the fundamental discrepancies of civil rights, equal opportunities, and quality of life as promised to people with disabilities. To fully understand how online education might successfully fulfill its promise of supporting social inclusion and increased employment, it is necessary to broaden the discourse of accessibility case law into areas of how to effect social change and the use of professional ethical standards for developing the missions of colleges and universities (Batavia & Schriner, 2001; Lee, 2003; Shneiderman, 2000).

2. Ten years after the ADA

The enactment of the ADA in 1990 was heralded as the ushering in of major social change for the United States, awarding people with disabilities civil rights that they had long been denied (Batavia & Schriner, 2001). These changes were expected to impact every level of government, business, and education. If a major corporation had decided to make equivalent changes in the running of their company, as the U.S. government did with the ADA, the corporate board would have demanded a detailed plan, including the allocation of time and expenses insuring success. However, the U.S. government did not have a plan for the implementation of the ADA.

The varying groups that would be impacted the most had differing expectations on what the purpose and outcomes of the proposed legislation should be (Batavia & Schriner, 2001). Without a specific plan of how to enact the ADA, lawmakers attempted to change many generations of discrimination against people with physical, mental, and learning disabilities by handing over the responsibility of the enactment to leaders in business, education, and civil rights advocacy (Lee, 2003). Disability advocates felt victorious after struggling for many years to gain recognition for the civil rights of people with disabilities; but not everybody was as jubilated as the civil rights advocates. The business press was publicly critical of the new law, implying that it would force employers to hire unqualified workers, inflict undue financial burdens caused by expensive modifications to workplaces and existing products, and increase other operating costs, such as medical insurance and worker's compensation. Educators were wary about having to mainstream students with special needs and the difficulty of simplifying curriculum to make it accessible and understandable for people with diverse learning styles. All parties were worried about the costs of litigation stemming from the filing of excessive frivolous lawsuits.

The implementation of the ADA was left without clear goals, outcomes, or coordination between governmental agencies (Batavia & Schriner, 2001). In addition, without a method of measuring the progress of social change, it was unclear to leaders how to determine if life was getting any better for people with disabilities because of the implementation of the ADA.

2.1. Employment

United States Census reports for the year 2000 showed that at a minimum, 8 million Americans had been certified as eligible to receive disability income and at a high end, as many as 50 million people had reported substantial impairments that limited major life activities (Kruse & Hale, 2003). Thirty-three million of these people are of working age. Only about 30% of working-age adults with

disabilities are employed full or part time, compared with 80% of adults without disabilities (Batavia & Schriner, 2001). Surveys report that over 75% of unemployed people with disabilities would like to have a job, but have not been able to find one. People with disabilities are three times more likely to live in poverty.

The economic lives of people with disabilities have not improved during the 1990's after the enactment of the ADA (Batavia & Schriner, 2001; Bound & Waidmann, 2002; Kaye, 2000a,b; Schur, 2003a,b). Some of these employment figures have been questioned in terms of differing definitions of what actually constitutes a disability under the ADA and how to derive ongoing employment levels. Initially, someone can be classified as protected under the ADA, but after workplace accommodations are set in place and they are capable of performing the essential functions of the job without impact to any major life functions, they are reclassified as not having a disability and are not tabulated into future employment figures concerning people with disabilities. Critics of the current Census report feel that many employed people with disabilities have not been counted. Even taking into account the possibility of underreporting, most disability rights advocates agree that the employment and income levels are the worse they have been in over 30 years.

A 1998 survey found that 95% of private firms have made some sort of accommodation for employees with disabilities and have adapted recruitment and preemployment screening processes to be accessible and nondiscriminatory (Kruse & Hale, 2003). Most of these accommodations were done voluntarily, without having to file a suit under the ADA. The average accommodation does not cost over US$500 and does not significantly impact the employer or other employees. These Census figures indicate that many employed workers that have accrued injuries have been able to maintain employment under the ADA where previously they would have lost their jobs.

2.2. Higher education

Access to higher education is one of the few areas that have significantly improved since the enactment of the ADA (First & Hart, 2002; Levy, 2001). College and university students have been protected against discrimination since 1973, with the passage of the Rehabilitation Act. Student enrollment had been statically low until after 1990. Students asking for accommodations increased significantly under the ADA, rising exponentially each year. The number of students seeking accommodations in New York doubled between 1992 and 1993. In Boston, the numbers were 10-fold by 1995.

Postsecondary educational institutions have not generally argued against the necessity to comply with the removal of architectural barriers that have prevented people with disabilities access to campuses (Levy, 2001). Additionally, a few colleges and universities began offering support services under Disabled Student Services that help students, faculty, and staff find accessibility solutions. Where such programs exist, students have been shown to succeed in their academic goals at higher rates than in institutions where students and faculty are not supported in finding alternate learning and teaching methods. Disabled Student Service programs also offer specialized training in the use of assistive and adaptive technologies. Unfortunately, because of the narrowly defined definition of disability used by the courts in deciding eligibility under the ADA and the Rehabilitation Act, most students with disabilities do not qualify for services or accommodations. Many students, who have grown to rely on these accommodations, later find that they are not entitled to them when they enter the workforce and are unable to competitively apply for jobs. While physical access has improved, the

majority of postsecondary educational institutions do not offer specialized support services to students with disabilities and most students still find it difficult to succeed at college because of their disabilities.

2.3. Online education and the Internet

The lack of access to computers and the Internet limits people with disabilities from learning essential skills needed to complete college, vocational, and job-related programs that could lead to more independent lifestyles (Kaye, 2000a,b). The term digital divide describes the measure that separates social populations into those that have and do not have access to computers and the Internet (First & Hart, 2002; Kaye, 2000a,b). Americans with disability are less than half as likely to own a computer and only one quarter as likely to use the Internet as someone without a disability.

Access to the use of computers and the Internet is correlational to educational success, income levels, access to health services, and other vital community resources (Kaye, 2000a,b). Less than 3% of people without high-school diplomas use the Internet compared to over 64% of people with college degrees. Even within each of these populations, people with disabilities are half as likely to own and use the Internet as those people without disabilities in the same grouping. Lower usage of the Internet has been linked to a lack of cultural affinity to the Internet for many populations on the wrong side of the digital divide. But contrary to other populations that are not connected, people with disabilities who have access use the Internet twice as often as people without disabilities (Preece, 1999). The courts have been inconsistent enforcing access to the Internet under the ADA for people with disabilities and they are being left out of many online educational opportunities.

3. Legislation, case law, and professional standards

For over 30 years, Federal and State legislatures have attempted to improve the lives of people with disabilities by mandating accessibility standards to regulate business, government, and architecture practices that would result in equal opportunities in employment, housing, and education (First & Hart, 2002; Frieden, 2003; Levy, 2001). The passage of the Rehabilitation Act of 1973 began legal protections for students at elementary schools, colleges, and universities from discrimination based on physical, mental, or learning disabilities. These rights include many types of reasonable accommodations in the physical facilities, programs, and specialized services that enable students with disabilities the same opportunities as those students without disabilities. The following sections will review some of the Federal legislation that has had the greatest impact on schools and colleges implementing accommodations for students, faculty, and staff by first discussing the implications of the case law and then analyzing the outcomes that these laws have had for people with disabilities, educational institutions, and employers.

3.1. Why case law

A review of case studies is particularly important in understanding progress towards access to online education because it is through these court decisions that academic administrators, manufacturers of

technology, and engineers formulate product standards and production quality measurements (Hudson, 2003). Consistency in case law is necessary to formalize processes leading toward accessible products and services.

The Rehabilitation Act, under Section 504 and Section 508, is intended to prevent discrimination in employment and education in any facility that receives Federal monies (Slatin & Rush, 2003). In 1998, amendments to Section 508 of the Rehabilitation Act expanded these guarantees to electronic and information technologies. The 1975 Individuals with Disabilities Education Act (IDEA) defined the process, through individual educational assessments (IEP) of the implementation of the Rehabilitation Act in K-12 schools for students that have been diagnosed with disabilities affecting their learning. In 1998, the IDEA was amended to include mandatory technology assessments for all students receiving IEP services. Additionally, the Telecommunications Act of 1996 required manufacturers of telecommunication equipment and providers of telecommunications services to ensure that all their products were accessible by persons with disabilities. While all of these laws have had significant effect on enforcing compliance to accessibility of technology, the ADA has had the largest impact in either advancing or restricting enforcement of accessibility standards (Abram, 2003; First & Hart, 2002; Frieden, 2003).

3.2. Definition of disability

The definition of what constitutes a disability under the ADA is difficult to ascertain through a review of case law (Levy, 2001; Schwochau & Blanck, 2003). Not all disabling conditions are protected under the ADA or sections of the Rehabilitation Act. The ADA defines a disability as a physical or mental impairment that substantially limits one or more major life activities, there must be a record of those impairments, and/or others must regard a person as having a disability.

These broad concepts have left equally as broad assumptions and interpretations of what constitutes a protected disability within case law (Levy, 2001; Schwochau & Blanck, 2003). The Supreme Court has determined that the extent that a disability limits a person from one or more major life activities is one way of determining a covered disability. This has only led to further confusion over what constitutes a major activity and how to measure a substantial limitation to that activity. Further confusion arises out of understanding when a nondisabled person is protected when others discriminate against them because they believe the person has a disability. If the nondisabled person is protected, when does the protection begin and end? Additionally, can there be punitive damages awarded? These are important unanswered questions that academic administrators need in developing policies and procedures covering accessibility practices on their campus, yet are still undefined under present case law.

Trying to unravel who is protected and what accommodations are required under existing law is a difficult process for students and school administrators, resulting in great disparities of policies and available services between academic institutions (Levy, 2001; Schwochau & Blanck, 2003). Most institutes of higher education, though, have not disputed that a claimant's disability is protected under the law, leaving a puzzling analysis of case law. Many disabilities, as defined under existing case law, are not protected, yet, educational institutions are still willing to provide services and accommodations. A review of case studies covering court decisions on the definition of disability indicate a strong tendency to narrowly define disabilities that are covered under the ADA and Rehabilitation Act (Schwochau & Blanck, 2003). In Bartlett *v.* New York State Board of Law Examiners, the district court held that a learning disability of dyslexia did not constitute impairment in a major life function because of a history

of self-accommodation by the plaintiff. While, in the Sutton case, the Second Circuit Court held that a person's reading skills, if below average, would constitute, by itself, a substantial impairment in a major life function for a student.

3.3. Discrimination of faculty members

Very few college and university faculty members are presently disabled, as defined under the law, and those that are have found it difficult to prevent losing their jobs due to their disability (Abram, 2003). Most court cases have been filed under the ADA although the Rehabilitation Act has less stringent requirements of proof. A review of case studies involving both tenured and nontenured faculty indicate that most cases do not ever reach a jury or judge for a decision on the merits of discrimination due to disability. Rather, most lose during a summary judgment stage because the plaintiff did not properly comply to complicated procedural requirements, including filing of a right-to-sue letter before filing deadlines, obtaining forms from the wrong source, running over the statute of limitations, or naming improper defendants who can be held liable.

The United States Supreme Court has also held that state entities, including colleges and universities, are immune from lawsuits under the ADA (Abram, 2003). Cases that have gone to jury or court decision have predominately ruled against supporting faculty members with disabilities, readily dismissing ADA actions brought against colleges and universities. Courts have typically accepted, without debate, an educational institution's definition of a job's essential job functions and their assessment of the plaintiff's inability to perform these functions.

In Majeske *v.* Congress of Connecticut Community College and Al-Marayati *v.* University of Toledo, the courts supported the university's claims that the instructors were fired because they were poor teachers, rather than because of their disabilities (Abram, 2003). In both cases, the courts did not wish to review performance evaluations supporting the teaching qualifications supplied by the faculty member. In Tobias *v.* Arizona Board of Regents and Tyndall *v.* National Education Centers of California, the courts also supported the universities' claim that the plaintiffs were asking for unreasonable accommodations to ask for classroom assistance and time to seek medical help. A few reported jury trials, such as Shott *v.* Rush-Presbyterian, decided for the side of the plaintiff, giving considerable monetary damages, but usually only when the faculty member was allowed to continue teaching during the time of the court case, finding it hard to disregard the teaching qualifications of the plaintiff.

3.4. Access to the Internet and online courses

The arguments surrounding forcing compliance to accessibility to the Internet are poised within a more general question of whether the Internet should be regulated (First & Hart, 2002; Frieden, 2003). There are two primary approaches opposing regulation of cyberspace, including the enforcement of accessibility for online education. One approach is formulated from a perspective of antigovernment control, allowing Internet providers to self-govern their products' content and usability standards (First & Hart, 2002). This libertarian approach further believes that it is impossible to regulate the Internet because of its immense, intertwined, and disconnected components. Cyberspace is seen as an intangible, virtual, nonphysical world that borders on spirituality and is something quite different than what is present in the real world. Any attempt to regulate the Internet is seen as an attempt to limit free speech. Another approach is based on the concepts of

allowing market forces to regulate the growth and direction of the Internet, with people with disabilities comprising a significant number of potential users and consumers of computer and Internet products and services.

There are many reasons people support the regulation of Internet activities; from wanting to protect children from abuse, prevention of cybercrime, to supporting the development of Internet accessibility and usability standards (First & Hart, 2002). Arguments based on accessibility tend to recognize that without government regulation of the Internet, there will be no guarantee of providing access for all people to the Internet. The clearest support for accessibility of educational materials has been around the questions of the effectiveness of communication and equal access of educational environments by people with disabilities (Frieden, 2003).

Compliance to the Rehabilitation Act and ADA complaints by students is the responsibility of the U.S. Department of Education through the Office of Civil Rights (OCR) (Frieden, 2003). Case law concerning access to the Internet and online education has concentrated in three areas of legal concern: access to effective communication, the definition of a place of business, and the reasonableness of use of finances (First & Hart, 2002; Frieden, 2003). Between 1994 and 1999, the OCR investigated eight claims within the California Community College system. Each complaint was resolved within the institution and each centered around issues of effective communication and equal access of both on-campus computer and Internet systems, specifically access to computer laboratories, usability of instructional and other course-related materials, library information, class schedules, and Internet classes. This approach of determining compliance emphasizes individual learning differences deriving from the effect that the environment has on a person's learning capabilities and their ability to understand information presented in alternate formats. It also places more importance on educational institution policies and procedures of how student services are provided than complying to generalized preset solutions that may or may not apply for all students.

The OCR used a three-pronged test to determine the adequacy of the access to educational resources and material: accuracy, timeliness, and appropriateness (Frieden, 2003). The timeliness and accuracy of the communication of information is such that the OCR recognized that for a student to successfully participate in a class, he/she must have the same advantages to information and discourse with other students and faculty members that other students have. The appropriateness of the communication concerns the modality in which alternate means of communication is delivered and the effectiveness of the communication for the student to understand the information. That the materials and information resides in a physical building or on the Internet did not matter to the OCR when the educational institution is considered a public university or college.

Even in terms of transportation services to public facilities, the OCR maintains the same criteria of effective communication (Frieden, 2003). In Martin et al. *v.* MARTA, a group of people with disabilities filed a claim under the ADA and the Rehabilitation Act saying that the public transportation system's Web site was not accessible. Following the precedence of the OCR, the courts found that alternate forms of communication, such as the telephone, were not adequate or equal to the information that was available on the Web site. In this situation, the information was not accurate, timely, or delivered in an appropriate format where people with disabilities could affectively use it in the way that others would expect to use the information. Interestingly, though, the courts did not say that the same system would not be valid in a different situation. Each Web site must be considered uniquely, dependent on the populations served, the content of the information, and the technologies chosen to carry the communication.

Another controversial area in which the courts have produced confusing case practice decisions concerns the definition of public accommodations (Computer and Internet Lawyer, 2003; First & Hart, 2002; Frieden, 2003; Hudson, 2003). Both the Rehabilitation Act in Section 36.303 and the ADA in Title III defines public accommodations broadly, but within a strict concept of a physical place. Advocates for people with disabilities would like the courts to broaden the definition further to include all virtual places on the Internet, providing a clear direction for a future accessible Internet (First & Hart, 2002). Opponents of broadening the definition to include all of the Internet, express that the intent of Congress was only for the ADA to apply to physical places and they had no intention of trying to regulate the entirety of the Internet, which was an unknown factor at that time (Computer and Internet Lawyer, 2003). For students with disabilities taking online courses, the possibility that large sections of the Internet are not accessible to them, places them at a disadvantage with other students that can obtain information and services anywhere (Frieden, 2003).

Case law is inconclusive on the definition of public accommodations at this time and is causing considerable confusion to those involved in Web site design and development (Hudson, 2003). Assistant Attorney General Deval Patrick stated in a letter to U.S. Senator Tom Harkin that it is clear under Section 36.303 that public places do include the entire Internet. In another highly publicized case, courts decided that Southwest Airlines' Internet site did not fall under the ADA's definition of public accommodations because the online ticket center did not have a physical place associated with its ticket service (Computer and Internet Lawyer, 2003). The Telecommunications Act of 1996 provided legislation that requires the products of all manufacturers and providers of telecommunication services, including those of the Internet, to be accessible for people with disabilities. But, like the ADA and Rehabilitation Act, the courts have emphasized clauses of undue burden and readily achievable, overriding many consumer attempts at enforcing the accessibility requirements.

3.5. Professional standards

Estimates of Web site inaccessibility to users with disabilities range from 80% up to 95% (Sullivan & Matson, 2000). In an attempt to help manufacturers of Internet products and services be in compliance with regulations mandating that their products are accessible to people with disabilities, several international organizations, nonprofit agencies, and private companies have attempted to provide design accessibility guidelines or evaluation tools to evaluate accessibility compliance (Chisholm, Vanderheiden, & Jacobs, 2001; Wall & Sarver, 2003). The ability of these standards and tools to actually help Internet designers develop accessible Web sites has been questioned by groups representing people with disabilities. Usability evaluations show that many accessibility problems are misidentified or go completely unnoticed (Sierkowski, 2002). In response to these findings, model evaluation methodologies have also been developed to assist in the design and development of accessible Web sites.

The Web Content Accessibility Guidelines 1.0 have been adopted by the World Wide Web Consortium (W3C) as the Web Accessibility Initiative and are intended to be used by all Web content developers and developers of authoring tools to promote accessibility (Bray et al., 2003; Chisholm et al., 2001). These guidelines provide comprehensive methodology and production standards to begin Web development. Priority errors are labeled between one and three determining the severity and or the population of users that may be affected by design considerations. Two usability problems have been identified with the W3C guidelines: (1) the complexity of the guidelines are difficult for multiple design

teams to coordinate effective product development, especially when team members are separated over long distances; and (2) usability errors have been reported by users of assistive technologies that are due to the vast differences between learning styles of people with disabilities and also because of the rapid introduction of new products that the guidelines did not consider (Jackson, 2003). Mere adherence to these guidelines does not verify compliance to accessibility laws.

A number of automatic validation tools are available to help evaluate the accessibility levels of a completed Web site, including Bobby, A-Prompt, W3C HTML Validation Tool, AccVerify, and Lift (Slatin & Rush, 2003, chap. 6; Sloan, Gregor, Rowan, & Booth, 2000). All of these tools are beneficial aids but assume that the developers have the time and motivation to comprehend the complex and often lengthy recommendations that the validation tools produce. Studies indicate that most designers have not been adequately trained in their use or fully understand the need to comply with accessibility requirements. These tools have also been found to bypass emerging technologies and miss important usability problems. Designers often will use these tools as evidence of accessibility compliance under Section 508, although most people with disabilities will still not be able to use the products. Acceptance of these tools does not verify compliance to accessibility laws.

The Digital Media Access Group at the University of Dundee, Scotland, carried out research into the potential of developing a single evaluative tool that could help developers create accessible Web sites and Internet products (Sloan et al., 2000). They were hopeful in finding a method that would comprehensively and efficiently uncover all accessibility problems and present the information uncovered in a way that would be usable by Web designers of products and services. The results of the Digital Media Access Group's study did not find a single tool or process that would achieve these goals. There are too many possible combinations of technologies, design attributes, and applications for one method to work in every situation. Additionally, computer user's capabilities are too complex for one method to be able to ascertain usability for all people. The best method of determining the extent of accessibility and usability of any product is to evaluate its use by observing people using the product (Sierkowski, 2002; Slatin & Rush, 2003, chap. 6; Sloan et al., 2000). In this case, those people must include people with disability and users of assistive technology.

Adobe Systems (2002) launched a company initiative to make all of their products comply with Section 508 of the Rehabilitation Act by forming a cross-functional accessibility task force with representation from all companywide departments, including engineering, user interface design, marketing, and sales. In addition, recognizing the essential need to involve manufacturers of assistive technology products and users of assistive technology into their accessibility design process, Adobe developed partner relationships with various assistive technology companies and service providers. These companies included Freedom Scientific, GW Micro, and SSB Technologies. Accessible products and services provided by Adobe under their Accessibility program have all been evaluated through usability studies incorporating major brand name accessibility products of screen readers and alternate computer control devices. Current accessibility products include Adobe Acrobat 6.0 and Adobe GoLive 6.0. These products have been accepted well by users of assistive technology and are being incorporated within training programs throughout the United States (Adobe Systems, 2002; High Technology Training Unit, 2003).

Another industry attempt at developing an accessibility development process was initiated by Sun Microsystems (Sun) (Jackson, 2003). In response to requirements stemming from Section 508 of the Rehabilitation Act for all Internet products and services to be accessible for people with disabilities, Sun established an Accessibility Program Office that created a Web site to help groups and individuals design

accessible products. Additionally, Sun established a set of accessibility guidelines that attempted to be inclusive of all matters pertaining to creating accessible products and services.

The process of establishing these guidelines tried to include existing companywide efforts already established within individual departments to come up with a single set of guidelines that could be used throughout the internationally based company (Jackson, 2003). Sun's emphasis was on the development of a single methodology and the training of all writers and developers on how to use these guidelines within their work. The process also included developing partner relationships with other software manufacturers whose products include assistive technologies and disability advocacy groups, such as Freedom Scientific, AT&T Bell Labs, Trace Research and Development Center, and the National Society for the Blind (Smaragdis, 2000). Sun's philosophy is that just because a product follows an accessibility guideline does not mean that it will be accessible for people with disabilities. Assistive technology developers and users must be part of all product design stages to insure usability of the final product. Sun's Java accessibility API has won acclamations from disability advocacy groups as helping others make usable accessibility products.

4. Is the ADA at fault for worsening employment and access to the Internet?

Business leaders have proclaimed that the effect of the ADA has failed to eliminate discrimination and economic inequities for people with disabilities and blame the ADA for the worsening employment opportunities (Schwochau & Blanck, 2003). To them, it is unnecessary and a bad law. They cite rising costs of Workers Compensation Insurance, costs for accommodations, and increased fear by employers over having to hire unqualified or unreliable workers as the primary reasons that employment for people with disabilities has worsened. While these factors are influencing employment trends, labor analysts identify other factors that have affected the outcomes more significantly. Employment trends that are associated with the cost of hiring a particular worker or the discrimination of certain populations typically respond to the overall economic vibrancy of the economy; in a tight job market, employment levels will be lower for the targeted population than in a good market. Employment characteristics for people with disabilities have not responded in any correlational fashion to the state of the economy.

It is clear that the Internet and online learning can significantly help improve the chances of successful involvement for people with disabilities in completing postsecondary degrees, vocational programs, and other independent living activities (Ritchie & Blanch, 2003). However, the Rehabilitation Act and the ADA were not written with computers and the Internet in mind (First & Hart, 2002). The courts have been reluctant in expanding definitions and statutes within these laws to provide protection against discrimination within online environments. It is also improbable that the courts are capable of defining pedagogical approaches that will define the mission of higher education that will be acceptable to educational administrators, teachers, and students alike.

The OCR has identified the effectiveness in communication and equal access of educational environments to be the key measurements to determine compliance to the ADA in higher education and online educational environments (Frieden, 2003). The transfer or availability of information is only one part of educational communication. Understanding, comprehension, and higher order intellectual reasoning, including independent and creative thought, are also reasonable expectations of educational communication. Whether a student is learning is a normal concern that a teacher will have for any of his/her students, those with or without disabilities; additional factors of unique learning styles or the use of

assistive technologies only adds complexity to a student assessment (Scherer, 2000). Teaching strategies that have worked for other students may not work as well for a student using assistive technology. Scherer (2000) found that most assistive technology is rejected by users because of inadequate training or because the technology does not match well with the user's environment. The environment includes teachers, other students, and support service providers not being able to effectively communicate to the person with the disability.

5. Beyond legal compliance

Access to the Internet is becoming more essential as it becomes increasingly integrated into the normal lifestyle of modern societies (Kaye, 2000a,b). Unfortunately, the promise of access to the Internet has not become real for most people with disabilities. While many physical barriers preventing access to employment, community activities, and education have been reduced in the last 10 years under the ADA, these improvements have not resulted in corresponding gains in college degrees and finding employment. What needs to be done, beyond compliance, to eliminate the digital divide?

5.1. An example of successful rehabilitation

Mitchell and Scigliano (2000) document the successful rehabilitation process of Mitchell, a retired university professor and university administrator, after losing his vision because of macular degeneration. Mitchell's usage of assistive technology became a critical factor in his rehabilitation and ability to maintain an independent lifestyle. According to Mitchell and Scigliano, the rehabilitation process was possible after overcoming four barriers to technology: physical access, intellectual competence, psychological feelings of powerlessness, and technological competence in an ever-changing technological environment. By overcoming these four barriers, Mitchell, despite his loss of vision, was enabled to continue to grow intellectually and be involved socially with the greater world around him. A closer look at the process of recovery reported by Mitchell and Scigliano reveals several constructs that are also typical of a successful process of vocational rehabilitation (Brandt & Pope, 1997).

The social model of rehabilitation has been accepted by professionals in the fields of rehabilitation science and counseling as being more affective in helping people with disabilities live independent and fulfilling lives than the previous medical model that was based on the medical and scientific expertise of professionals (Brandt & Pope, 1997). The social model of rehabilitation became the basis of the ADA by defining that the level of a person's disability is dependent on the nature of the environment. The environment is positive and enabling when it supports a person's usage or functional capabilities or it can be negative when it is disabling, restricting a person's functional activities. In a similar fashion reported by Mitchell and Scigliano (2000), Brandt and Pope identify the environment as having both physical and social constructs, including natural and man-made physical barriers, psychological barriers of self-esteem, and social barriers reflecting cultural patterns of acceptance and nurturance.

Mitchell's rehabilitation process began with his relearning how to perform essential personal functions of self-care, walking, and the ability to travel beyond his home independently (Mitchell & Scigliano, 2000). Regaining the self-efficacy or the assurance that he was capable of taking care of

himself provided him the personal strength to reestablish friendships and other social relationship. These initial supportive social relationships further increased his confidence that he could be successful in rehabilitation. However, Mitchell's biggest fear was to lose his intellectual ability to learn and be intellectually involved with others. Mitchell needed to learn new technological skills that would keep him current in his professional fields and allow him to maintain professional contacts. Mitchell first went to independent living centers and disability advocacy centers that provided introductory classes and support in new assistive technologies. He learned basic computer skills and became aware of the growing ability of assistive technologies to provide access to information and digital communication resources. Mitchell also realized that while providing essential social and technical resources, the centers could also hold him back. To fully regain his independence, he needed to advocate and control his own future.

Essential factors in Mitchell's rehabilitation were the availability of independent living centers, training to use assistive technology effectively, and his confidence and ability to advocate for his own life goals (Mitchell & Scigliano, 2000; Ritchie & Blanch, 2003). Independent living centers provided Mitchell with a positive environment supporting self-reliance. They provided essential independent living skills and technical training that supported positive self-efficacy. Moreover, independent living centers provided Mitchell with the initial assistive technology and training that enabled him to look outside the possibilities provided at the center itself. It was then up to his own self-advocacy abilities and personal motivation to control his life and find happiness and fulfillment.

5.2. Universal usability

The Code of Ethics of the Association for Computing Machinery (ACM), an international professional organization that promotes the advancement of information technology, supports the usability of computer resources for all people, regardless of disabilities (Shneiderman, 2000). Shneiderman identified three research challenges that are necessary for universal usability of Web-based services to become a reality: (1) The vast variety of technology-related hardware, software, and networks result in an endless combination of technical configurations. Trying to account for all possible outcomes is unlikely. (2) Differences in accommodating for user diversity are almost as complex as the possibilities in technical variations, especially when any user might respond differently each time they use a technology. (3) The gaps in what a user of technology needs to know and what they actually know is becoming wider with the advancements in Internet technology.

Current research on the usability of assistive technology indicates a complexity of neuro, emotional, and learning factors that can either support or prevent a person's successful use of educational technology (Baloian, Luther, & Sanchez, 2002; Harrison, 2003; Mull & Stilington, 2003). The use of synthesized voice screen readers, tactile information displays, voice-activated computer control applications, or alternate computer control devices can affect the normal learning process, often increasing the cognitive memory load and making it harder to learn (Yesilada, Stevens, & Goble, 2003). This research indicates that it will be difficult to comply with the OCR's standards for efficient communication of educational materials by merely providing information in an accessible format, that is, Braille, text, or as captioned information (Frieden, 2003). Effective support services and classes in the use of assistive technology, enabling students to understand, comprehend, and participate in college level learning environments, are also needed (Baloian et al., 2002; Harrison, 2003; Mull & Stilington, 2003).

5.3. Community-based resources and online communities of practice

Independent living centers and disability rights advocacy centers are nonprofit, nonresidential, community-based organizations directed by persons with disabilities (Ritchie & Blanch, 2003; Slatin & Rush, 2003, chap. 4). Independent living centers were first established and funded in 1973 through the Rehabilitation Act, but it would be incorrect to think that they began through governmental legislation. People with disabilities, motivated by the success of the civil rights movements, embarked on their own civil action to achieve social equality through equal rights legislation and the end of discrimination towards people with disabilities. Today, Centers for Independent Living provide many essential services addressing the ability of people to live self-reliant and independent lives. Some of these programs are peer-role modeling, consumer action representation, legal support and advocacy, advocacy training, financial training, and assistive technology training. The core belief of the independent living movement is that individuals with disabilities are in the best position to help other persons with disabilities to live independently.

A number of community-centered technology initiatives have produced productive models of how to successfully overcome the barriers producing the digital divide (Ritchie & Blanch, 2003). Community Technology Centers (CTCs) have formed in all communities that have active Centers of Independent Living. There are over 500 CTC programs nationwide. These centers typically are underfunded and operate solely with volunteer workers. The Alliance for Technology Access (ATA) is a nationally affiliated group, based in San Rafael, CA, that has resulted in many technology resource centers, supporting a community of people associated with the delivery of assistive technology. The ATA activities include the hosting of national assistive technology conferences, extensive research into the usability and delivery of assistive technology, and the development of funding for assistive technology programs.

Many community colleges and universities support Disabled Student Programs that not only provide educational counseling, but technology evaluations and training (High Technology Training Unit, 2003, p. 1). California's High Technology Center, located at De Anza Community College, is a model-training program that provides technology assistance to 107 California Community Colleges. The High Tech Center Training Unit of the California Community Colleges supports community college faculty and staff wishing to acquire or improve teaching skills, methodologies, and pedagogy in assistive computer technology, alternate media, and Web accessibility. The yearly International Conference on Technology and Persons with Disabilities, hosted by California State University at Northridge (CSUN), brings together most people involved in independent living centers, disability advocacy centers, education, and the manufacturing of assistive technology products, where the latest achievements in assistive technology can be shared (Center on Disabilities [CSUN], 2003).

5.4. Communities of practice

A study by Eklundh et al. (2003) investigated the use of home pages on the Internet, within the KnowHow Project, to ascertain the feasibility of forming adult online learning communities based on personal home pages. Personal home pages have been identified as the most visible Web genre and the most identifiable to a person's interests, personality, and emotional perspective. The home page allows an individual to present personal information to other users. They can be set up as either global or local access, depending on the goals and direction of the community and the individuals involved. Eklundh et

al. explored the extent that knowledge is shared individually through home pages and the ability of groups to form a cohesive community. Members reported greater feelings of affect towards other community members, increased motivation to participate in community activities and discussions, and improved self-efficacy in being able to navigate and use online technology resources.

Another example of an accessible online educational community of practice where students with disabilities are able to participate equally with nondisabled students is the master's degree program in Rehabilitation Counseling at San Diego State University (Sax, 2002). An essential construct of a graduate program in counseling is the high level of trust, communication, and mutual support that is developed between students and faculty. Rehabilitation Counseling programs typically have higher than average enrollments of students with disabilities. The first graduating class of Spring 2000 had 200 students, representing 18 states, three Pacific jurisdictions, with 15% of the students with diagnosed disabilities needing accommodations. Accommodations for all instructional materials included captioned videotapes with text transcriptions, videotapes copied to audio tapes, materials labeled and produced in Braille, all Web site information easily read from a screen reader, streaming videos captioned, and sign language interpreters hired for special assignments. Student and faculty evaluations of the online learning experience ranged from excellent to very enthusiastic. No differences between the online and face-to-face relationships were measured, especially in the quality of peer relationships and professional relationships formed out of cooperative learning projects.

6. Conclusion

People with disabilities are not better off 10 years after the enactment of the ADA than before its passage. The promise that technology would eliminate barriers to education and employment has not happened as expected. Instead, the digital divide represents the increased gulf between those people that are able to benefit from the Internet and those who cannot. It is time for online educators to look beyond mere compliance of the ADA to fulfill educational goals of preparing all students to be productive citizens. Research into the following questions is needed to help develop accessible online educational environments that will eliminate the physical barriers preventing access to people with disabilities and also enable them to learn effectively and compete equally for employment opportunities:

(1) How to fully integrate universal usability technologies into online educational formats to insure the elimination of accessibility barriers.
(2) How to develop online instructional strategies which are capable of effectively communicating with all students, inclusive of those with learning, psychological, and physical disabilities or necessitating the use of assistive technologies to access the Internet.
(3) How to effectively make available accessible online communities that provide student support services, such as those from Disabled Student Services and community-based assistive technology centers, to students enrolled in distance online educational programs.
(4) How people with disabilities can be included within university decision-making and governing bodies so that they are actually in control of their educational opportunities.

Online educational programs have the capability to enhance the independence and well-being of people with disabilities, especially for those students with communication disorders, abnormal

behaviors, and physical impairments that make accessibility to campus learning difficult. Online learning can happen anytime and anywhere. It should also be accessible to anyone.

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