Information Technology and the Workplace: Implications for Persons with Disabilities[1]

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Abstract

The Internet improves access to employment and community for many people. However, there is growing concern that many Web sites are inaccessible to people with certain disabilities. This article examines the impact on people with disabilities of online human resources processes used for employee recruitment, benefits, and training. In 2002, Cornell University staff reviewed the accessibility of 10 Job boards and 31 corporate e-recruiting Web sites. Human resource (HR) professionals are well positioned to report on key issues regarding these processes. A survey of 433 HR representatives was conducted regarding their organizations' use of information and Web technology in HR processes; knowledge of computer/Web barriers to employees with disabilities; and familiarity with assistive technology and resources. The authors summarize current literature and legislation relevant to Web accessibility, and discuss implications of their findings for businesses and people with disabilities in the workplace.

Importance of the Problem

Growth of the Internet and Computer Use

Americans are buying computers and connecting to the Internet in ever greater numbers. In the fall of 1998, there were about three million World Wide Web sites available to Internet users. By

early 2002, there were nearly 40 million (Zakon, 2002). In December of 1998, 32.7% of individuals aged three and older used the Internet; by September 2001, that percentage had grown to 53.9% (U.S. Department of Commerce, 2002). As of April 2002, there were 165 million Americans online -- nearly 60% of the population (Nua Internet, 2002). By the following year, about 66% of the population had Internet access, and that number climbed to 75% by February, 2004 (Nielsen/Netratings, 2004).

This rapid growth in computer and Internet use has not been the same for individuals with disabilities. A report by the U.S. Department of Commerce (2002) found that 63.1% of people aged 25-60 without disabilities had used the Internet, while people with disabilities in that age range were much less likely to have accessed the Internet (ranging from 30.3% of those with multiple disabilities to 54.8% of those who were deaf or had a severe hearing impairment).

Kaye (2000) focused on those with access to a computer and the Internet. He analyzed uses of the Internet by those aged 15 years and over, with and without a work disability, using 1998 and 1999 Census Bureau data. For the most part the use patterns of those with and without a disability were very similar. The most common application was e-mail, used by seven out of 10 people with disabilities. Six out of 10 searched for information, and four out of 10 used the Internet for news and weather information. About a third (29.3%) of those with a work disability reported using the Internet for courses and schoolwork, compared to 35.2% of those without a disability. Job-related tasks were far less likely to be performed online by those with a disability 26.2% as compared to 43.1% probably reflecting the fact they are less likely to be employed. Interestingly, despite this, individuals with disabilities are just as likely to use the Internet to search for jobs as those without disabilities 15.9% and 16.7% respectively.

An online poll by Harris Interactive (Taylor, 2000a) found that the Internet can have a positive impact on adults with disabilities. Adults with disabilities were more likely to report that the Internet had significantly improved the quality of their lives than those without disabilities (48% vs. 27%). Adults with disabilities were also more likely than those without disabilities to report that the Internet helped them to be better informed about the world (52% vs. 39%), feel connected to the world (44% vs. 38%), and reach out to people with similar interests and experiences (42% vs. 30%). This reported impact on individuals with disabilities underscores the importance of ensuring Web accessibility to all, regardless of disability. Internet access may help to counteract the findings of another Harris poll that found that individuals with disabilities were more likely to feel isolated, feel left out of their communities, and express a desire to participate more (Taylor, 2000b). These results further emphasize the importance of ensuring accessibility to all.

Businesses are also becoming increasingly network intensive, both internally (intranets) and externally (Internet) (Schrage, 2000). A cross-sectional survey of 248 executives from larger companies was recently performed by Towers Perrin (2001b). They found that 86% saw the Internet as changing business practices and processes. Nearly half (48%) expect that the Internet will result in a significant change. The Web's influence in this area is not limited to large businesses. A survey performed at the Harvard Business School (Kanter, 2001) found that small (fewer than 100 employees) and medium (100-500 employees) businesses matched or outpaced larger businesses in the use of the Internet for internal operations such as training and receiving

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employee feedback. At least a third of all companies surveyed used the Web for each of the purposes asked about in the survey, ranging from attracting new customers, to purchasing, to conducting online meetings.

Given these predictions and expectations, it is important to examine the impact of the Internet on employees, specifically those with particular disabilities; the impact of the Internet will likely depend on the type and nature of the person's disability. For those with mobility related impairments, many of these technologies may be enabling, allowing easy access to information, contacts, and resources. However, these cutting-edge Web applications also have the potential to be significant barriers for those who have visual or hearing disabilities, or limited dexterity for mousing/navigating, unless the applications are designed to be accessible.

Web Accessibility is an Issue

Although there is a great deal of literature on how to make Web sites accessible, there are few published studies evaluating the accessibility of existing sites. Most accessibility studies utilize automated accessibility testing software such as Bobby v3.2. Bobby was developed by the non-profit Center for Applied Technology (CAST) to analyze a Web page's conformance to the World Wide Web Consortium's (W3C) Web Accessibility Initiative (WAI) Web Content Accessibility Guidelines. (Visit www.w3.org/TR/WCAG20/ for a description of these guidelines). It is designed to check for errors that cause accessibility concerns, and it generates a report listing the type, number and the location where the error was detected.

A recent study examined the accessibility of more than 1,800 state and federal government Web sites, and found that 17% met standards of accessibility. These standards included either Bobby approval (5%), W3C or section 508 compliant (4%), or had a text version available or text labels for their graphical images (8%) (West, 2001). Regarding commercial sites, Heller (2001) states that very few companies have made their Web sites accessible, or have even considered it, primarily due to concerns about the expense of doing so. This concern about costs persists despite the fact that making a site accessible is estimated to run about 1-2% of the entire site cost, according to Kynn Bartlett, the director of the HTML Writers Guild's accessible Web Authoring Resources and Education Center (Heller, 2001).

One of the most comprehensive studies to date of Web accessibility examined the 50-100 most visited Web sites in six categories: overall most visited, clothing, international, jobs, college, and government (Jackson-Sanborn, Odess-Harnish and Warren, 2001). Bobby v3.2 was used to evaluate the first layer of each of these sites. The results discussed only Bobby "Priority 1" errors, which CAST defines as problems that "seriously affect a page's usability by people with disabilities." Priority 1 errors are often "show stoppers" issues that could prevent some individuals with disabilities from being able to access information on the site or proceed to other areas of a site. For example, if a link is illustrated with an image only, and no alternative text is provided, a visitor using a screenreader would not know where the link was pointed. Only 33% of sites passed without Bobby's priority 1 error flags. The government sites performed the best, with 60% passing without Priority 1 errors. Of the 100 most popular sites on the Web, 85% were found to have Priority 1 accessibility errors.

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Legislation Relevant to Internet Accessibility

Several major federal laws are applicable to Web accessibility, including the ADA, Sections 501 and Section 504 of the Rehabilitation Act of 1973, and in particular the following two pieces of recent legislation:

- *Section 508 of the Rehabilitation Act*, as amended (1998), which requires Federal agencies' electronic and information technology to be accessible to people with disabilities, including employees and members of the public (see www/section508.gov/docs/508law.html); and
- *Section 255 of the Telecommunications Act of 1996* , which requires manufacturers of telecommunications equipment and providers of telecommunications services to ensure that such equipment and services are accessible to persons with disabilities, if readily achievable. The Federal Communications Commission's Report and Order implementing Section 255 was released in September 1999 (see www/fcc.gov/telecom.html).

These laws have begun to bring about improvements in accessibility. In 1999 the National Federation for the Blind (NFB) filed suit against America Online Inc. (AOL) based on the ADA's equal access provisions. NFB used the ADA because AOL's service was not compatible with screen reader software used by blind and visually impaired people that translates text to speech. The NFB dropped their suit after AOL agreed to make its browser software compatible with the screen reader software (Gibson, 2001). In the wake of this suit, the IRS's e-filing partners HDVest Inc., Intuit Inc., and H & R Block have agreed to make their sites accessible. Some of the response to these lawsuits in the popular business press has been quite negative, emphasizing potential liability and frivolous lawsuits related to lack of accessibility (Frezza, 2000; Olson, 2000; and Schrage, 2000). More recently, the first U.S. federal court opinion on the applicability of the ADA to the Internet was issued (Access Now Inc. v. Southwest Airlines Co., 227 F. Supp. 2d 1317 [S.D.Fla.] [2002]) opining that the ADA does not apply to Web sites, as they are not "public accommodations" covered under the law (National Council on Disability, 2003). This decision is still on appeal, and National Council on Disability (NCD) argues that the issue of what constitutes a "place" of business must continue to be addressed in the courts and through laws (2003).

Increasing Use of Web/Online Recruiting

Recruiting qualified employees is a major concern for businesses. The Internet has become one of the primary resources that companies use to find employees. With millions of jobs and resumes available online the "Internet has become the most effective way to broadly disseminate information about the availability of jobs and people" (How online recruiting changes the hiring game, 2001). Research by Goldman Sachs showed that between the beginning of 1999 and November 2000, traffic to career-oriented Web sites more than doubled, to 12.3 million unique visitors per day (Rosenwald, 2000). A July 2001 poll of 400 recruiters by Recruiters Network found that 78% felt Internet job postings were the most effective way to spend job search budgets, far outstripping newspaper classifieds (12%) and career fairs (7%) (Gill, 2001).

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A January 2001 poll by the Society of Human Resource Management (SHRM, 2001) supports these findings: Internet job postings were used by 88% of human resource (HR) managers surveyed, just slightly less than the proportion using personal contact/networking (95%), newspaper advertisements (96%) and employee referrals (91%). Internet job postings came in ahead of headhunters (74%), employment agencies (76%), and advertisements in professional and trade journals (67%). The survey also asked about the effectiveness of these different recruiting methods. The majority (58%) of the respondents said that Internet job postings were an effective or extremely effective method of search techniques, just slightly less effective than the highest rated "personal contact/networking" (61%).

A survey of 150 hiring executives in the 1,000 largest U.S. firms found that nearly half (48%) preferred to receive resumes by e-mail, a significant change from 1998 when only 4% had this preference ("*No Postage Necessary"*, 2000). Dow Chemical has gone even further was issued they are no longer accepting paper resumes for professional positions (estimated 1,500 people nationwide) and are recruiting all new salaried workers from their pool of online candidates (Gill, 2001). A Towers-Perrin survey of 200 organizations found that 98% offered or planned to offer, online job postings by the end of 2004, while 88% would offer online application for posted jobs by the end of 2004 (Towers-Perrin, 2003).

Job seekers have also turned to the Internet. A 1998 study performed by J. Walter Thompson's Specialized Communications Group found that 70% of all active job seekers preferred the Internet to other methods and that more than half the general public planned to use the Internet to find their next job (Conhaim, 1998). The Society for Human Resource Management (SHRM) search tactics poll (2001) found that 96% of job seekers surveyed had used Internet job postings to look for a new job. While that is a very high percentage, it is important to note that the job seekers polled had signed up for the CareerJournal.com's Job Alert list, and were therefore more likely to have used online job searching than a random sample of job seekers.

Web recruiting technology allows an applicant's job hunt to reach more widely than ever before, which can be a great benefit to someone with a mobility disability. It also creates a concern regarding access for minorities and people with disabilities, who are less likely to have a computer and Internet access (Kaye, 2000). Only 18% of the 100 most heavily trafficked recruiting sites were found to meet all Bobby Priority 1 requirements (Jackson-Sanborn, Odess-Harnish, & Warren, 2001). Given these results, inaccessible Web-based recruiting presents a significant employment roadblock for those who have disabilities that prevent them from using a primarily visually-oriented, point and click environment.

Methodology

Background of the Research Project

This article describes results from a Research and Demonstration Project funded by the U.S. Department of Education National Institute on Disability and Rehabilitation Research (NIDRR) to the Cornell University Employment and Disability Institute in the School of Industrial and Labor Relations-Extension Division, to study ways to improve the employment practices covered by Title I of the ADA. The study was done in collaboration with the Society for Human

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Resource Management, which is the world's largest association devoted to human resource management and represents more than 175,000 individual members, the Washington Business Group on Health, and The Lewin Group, a premier national health care and human services consulting firm (www.lewin.com). This research began in 1998 with the original goal of investigating the impact of the ADA on the employment practices of small, medium, and large private sector businesses, in order to assist in the identification of the greatest challenges to implementing the employment provisions of the ADA, and to identify interventions that could address these issues. Human resource (HR) professionals were selected as the informants for this study, because of their critical role in workplace hiring and retention processes. HR professionals are responsible for recruitment, pre-employment screening, interviewing, and other workplace practices that affect the hiring of workers with and without disabilities. Compensation, benefits, training, performance management, and staff development are also often the responsibility of the HR department. In this study, employment policy and practices that enhance both the hiring and retention of workers with disabilities were examined. Results of these inquiries assisted in the identification of progress made in the implementation of the ADA in business organizations to date, and remaining problem area and barriers to the employment and retention of people with disabilities.

While this research was in process, new technologies were creating an emerging issue in workplace accessibility. The focus of the project was therefore broadened to include a preliminary inquiry into employers' use of IT in employment more generally, while still focusing on human resources management processes and the accessibility of these services.

The first phase of the IT-related research was a review of selected e-recruiting Web sites, and the second phase of the research was a survey of HR professionals regarding their organizations' use of Web technology in HR processes and computer accessibility issues in the workplace. In this second phase of the research, we returned to survey those HR professionals who were drawn from the SHRM membership who had been participants in the earlier research examining disability nondiscrimination workplace policies and practices and accommodation more broadly. We here give a brief review of the first phase of the research, but will be focusing on the second phase of this effort.

Ten job boards and 31 corporate e-recruiting Web sites were evaluated for accessibility for people with disabilities. Job Boards are defined as an Internet site where employers pay to post their positions and to search the resume database for candidates. Candidates can search and apply online for positions as well as post resumes for free. The examination of the job boards and Web sites was performed using both an automated accessibility testing software (Bobby v3.2) and an evaluation of a sub-sample of the sites through a "simulated" application process. The simulated application process was performed using only the information available to a screen reader and navigating the site using only keyboard commands, duplicating how a blind individual would navigate the Web. The purpose of this was to see if it would be possible to successfully proceed through the entire multi-step job search and application process.

None of the job board pages (home, job search, signup, or resume submittal pages) were found to be accessible according to Bobby standards. The vast majority of corporate e-recruiting sites also failed Bobby's tests. The simulated application process assessment was slightly more promising,

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but only three of the nine job boards and three of the 12 corporate sites evaluated were accessible enough to work through the entire process of registration, job searching, resume submittal, and application for a position. Many of the issues encountered could easily be corrected through the consistent use of alternative text for essential submit image buttons (i.e. "apply", "post resume";) (Erikson, 2002).

Findings from this phase of the study contributed to the second phase the survey of HR professionals, described in the remainder of this paper.

The Survey Instrument

The survey was pilot tested on nearly two dozen Cornell University HR professionals. It was then revised and retested to ensure the clarity of the questions and validity of data collected. In addition to gathering respondent and organizational characteristics, the survey incorporated questions on the extent of computer use in the organization, scope of online technologies applied to human resource processes, awareness of potential barriers computers might present to people with specific disabilities, knowledge of assistive technology and accessibility resources, as well as familiarity with computer-related adaptations made for employees with disabilities, availability of employees trained in computer accessibility, helpfulness of organizational resources to address accessibility issues and other types of resources/solutions. The final survey instrument took approximately 10 to 15 minutes to complete.

Sampling

The sample for the 2002 survey consisted of the 813 members of the Society for Human Resource Management (SHRM) who had participated in the original 1998 survey. SHRM, the largest human resource organization in the United States, was sampled with the assumption that this would provide respondents who clearly identify themselves by interest and function with the HR profession. The original SHRM survey sample was comprised of 1,402 randomly selected SHRM members, chosen to provide a sample representing small, medium, and large organizations in the U.S. (Brannick & Bruyère, 1999). Choosing to survey the respondents from the 1998 survey may mean that results presented here are not reflective of the knowledge of newer SHRM members, as our respondents were for the most part more seasoned professionals.

Data Collection and Analysis

Announcement letters were sent to potential respondents in May 2002. Data collection began 5 days later and was completed in July 2002. All surveys were conducted by telephone using a CATI (computer-assisted telephone interviewing) system. Hard copies of the survey were available to respondents via e-mail and fax if requested. If the original respondent was no longer with the company or otherwise unavailable, attempts were made to locate an appropriate and/or equivalent informant within the company. A total of 493 individuals were successfully contacted, of whom 433 completed the survey (60 refused to participate), resulting in an 88 % response rate. Overall, 59 % of the respondents had also participated in the 1998 survey. Most of the 320 original respondents, who were not resurveyed in 2002, had invalid phone numbers, were no longer with the company, or unavailable for some other reason.

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Basic descriptive statistics were generated for this report. In addition, selected questions were further examined using specific factors such as organization type, size, and whether the organization had experienced making adaptations to a computer for an employee with a disability, to explore the impact of these factors on responses. Chi-squared tests and T-tests as appropriate were used for performing these comparisons. In cases where low expected cell counts were encountered Fisher's exact test was used in place of Chi-square test. The $p<.05$ significance level was used throughout, applying Bonferroni's adjustment procedure for multiple statistical tests within issue categories where required to control for compounding comparison-wise Type 1 error rates. Across all survey questions fewer than 4% of respondents answered "don't know/refused" on average. Given this small number, these responses have been excluded from the analysis presented in this report.

Respondent and Organization Characteristics

Approximately one quarter (24 %) of the respondents were from very large companies (those with more than 5,000 employees), a third (33 %) were from medium to large-sized companies (more than 500, but less than 5,000) and the remainder (43 %) were from smaller companies (those with fewer than 500 employees).

The respondents represented a spectrum of industries as well. Two in 5 were from service industries and 1 in 5 was in durable or non-durable manufacturing. Together, finance and insurance represented 13 %, 7% were high-tech industries, while public administration and transportation/utilities each represented 6%, and companies in the retail/ wholesale trade made up 5 %.

Survey Results

Computer Use

One of the issues of interest was the extent of computer use by employees of the respondents' companies. The majority of HR informants in all industries reported that most of the company's employees used computers at least part of the time. Fewer than 1 in 10 employees in finance, insurance and high-tech/ computer/telecommunications do not use computers at all, and fewer than 1 in 5 don't use computers in the public administration and service industries. Only slightly more than a third of the workforces in the manufacturing, transportation/utilities and retail/wholesale trade do not use computers at all.

While the majority of the employees in the participants' companies use computers, we also asked "What percentage of existing positions in your organization require using a computer more than half the workday?" Even in the industries with the lowest computer use (transportation/utilities, manufacturing, and retail/wholesale trade), 2 out of 5 employees spend at least half the workday on computers. Three out of 5 positions in public administration and service industries use computers more than half the day, and 4 out of 5 in the insurance, high tech and finance sectors use computers this much.

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Use of Online Technology in HR Processes

In order to determine the distribution of online technologies in human resources within the sample, the survey included a question asking about the use of four prominent online HR technologies (online job postings, online benefits information dissemination, online benefits self service, and online employee training). The majority of the respondents reported their companies were using each of the four online technologies to some extent. Overall, more than two-thirds reported using at least three of the online technologies, with only 3% reporting not using any. Online job postings were by far the most commonly used: nearly nine out of ten companies reported using them, and nearly half (44 %) use them "a great deal." Online benefits information dissemination was also common, and was used by more than 4 out of 5 companies; one-quarter reported using it "a great deal." Online benefits self service where an employee can alter personal benefits online was used by over half the companies, and was used a great deal by nearly 1 out of 5. The majority (63 %) of respondents also reported that their companies made use of online training, but its use was not as intensive, with only 4% reporting using it a great deal. Larger companies were significantly more likely to use these HR technologies than smaller companies, and to use them more heavily.

Familiarity with Assistive Technologies

The respondents were asked about how familiar they or their staff were with six of the most common assistive technologies used to adapt computers or information technology applications (screen magnifiers, speech recognition software, video captioning, Braille readers/displays, screen readers, guidelines for Web design). Nearly half (46 %) were familiar with screen magnifiers, although nearly a third were unfamiliar with this technology. Approximately a third reported familiarity with speech recognition software. Video captioning was familiar to one out of four respondents, but was unfamiliar to over half. Assistive technologies designed for blind individuals were unfamiliar to the majority of respondents. Braille readers/displays were familiar to only 1 in 5 respondents, while only 16 % of respondents were familiar with screen readers. As would be expected, those who reported having made computer adaptations for employees were more likely (in most cases, twice as likely) to report familiarity with each of these technologies.

Overall, only 13 % of all respondents noted familiarity with guidelines for accessible Web design, with those from larger organizations (500+) more likely to report familiarity (17 % compared to 9%). Those with experience adapting computers for accessibility were more than twice as likely to be familiar than those without this experience (19 % compared to 7%). Considering the number of organizations utilizing Web-based HR processes, this low level of familiarity highlights an area of real concern.

Following up on this issue, respondents were queried about their awareness of whether any of their organizations' HR Web sites had been evaluated for accessibility for people with disabilities. Of those who had such sites, only about 1 in 10 said they were aware of an evaluation, 2 of 5 said their sites had not been evaluated, and slightly over half were unsure. Even though those with experience adapting computers for accessibility were more than twice as likely to report evaluating their Web sites for accessibility, this still accounted for only 14 % of that sub-group, compared to 6% of those without experience. Although the sample sizes by

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industry are small, it is interesting to note that the public administration respondents were more likely to say their sites had been evaluated (21 %) than those in other industries. This may reflect a greater awareness of governmental legislation regarding accessibility (i.e. Section 508).

Computer Adaptations Made for Employees with Disabilities

Despite the large number of respondents who were not very familiar with accessibility issues, nearly half reported having made alterations to make a computer accessible to an employee with a disability, and only 1% reported being unable to accommodate. As might be expected, larger companies were more likely to have made adaptations for employees with disabilities, because they would be more likely to have a larger number of employees with disabilities. Nearly three quarters (73%) of the largest employers (5,000+ employees) had made adaptations, compared with six in 10 medium-large companies (500 to 4,999) and three in 10 small companies (less than 500).

The single adaptation reported by nearly half of those respondents who reported making accommodations was that of altering the workstation. Making computer workstations accessible to employees using wheelchairs (26%) was also common, but also smaller changes such as special keyboard trays for individuals with carpal tunnel problems were mentioned. Nearly two-thirds of the adaptations (65%) were for individuals with visual impairments, and included screen magnifiers (41%), large screens (16%), screen readers (8%) and Braille readers (6%). Special computer input apparatus such as mice, keyboards and pointing devices were mentioned by almost a third (31%) of those who had made adaptations. Voice recognition software was also mentioned by 1 in 5 respondents.

Perceived Barriers for Specific Disabilities

Given the extensive amount of computer use in the workplace reported, we examined how HR representatives viewed barriers posed by Web/computer technology to individuals with different disabilities. Five categories of disabilities were inquired about -- wheelchair users, visually-impaired/ blind users, deaf users, fine motor limitations that restrict use of keyboard or mouse, and cognitive or learning disabilities, and respondents were asked how significant a barrier Web/computer technology would be for individuals with each of these disabilities.

Only 2% saw wheelchair users as experiencing a significant barrier when operating a computer, with a large majority (86%), viewing it as "not a barrier at all." At the other end of the scale, over a third of respondents rated Web/computer technology as a very significant barrier for people with visual impairments, and half considered it somewhat of a barrier. The majority of respondents also saw those with fine motor limitations and cognitive/ learning disabilities as encountering at least "somewhat" of a barrier. Only 1 in 10 saw computer use as not presenting a barrier at all to people with these disabilities. Interestingly, although fewer respondents saw technology as presenting a very significant barrier to users who are deaf, only about half rated it as "not a barrier at all."

Do companies who have introduced computer adaptations for employees with disabilities in the past assess potential barriers differently? To answer this question, the assessment of barriers by

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organizations reporting having made computer adaptations for employees with disabilities was compared with the organizations that had not done so. Respondents who had *no experience* making adaptations were almost twice as likely, compared to those who had made adaptations, to rate a visual impairment as a very significant barrier (47% and 27% respectively). They were also much more likely to judge fine motor limitations (23% and 12%, respectively) and cognitive or learning disabilities (17% and 10%) as very significant barriers. These results suggest that the experience of having made accommodations may have a positive effect on the attitudes held by the respondents (HR professionals) regarding the ease or difficulty (or perhaps knowledge of choices available) of adapting computers for employees with disabilities. Assessment of the degree of the barriers did not differ by size of the organization.

Familiarity with Accessibility Resources

The HR representatives were asked about their (or their staffs') familiarity with five IT accessibility resources. If they were familiar, they were asked whether or not the resources had been used by their organization. Nearly half (44%) were not familiar with any of the five resources asked about. The majority of the respondents had little knowledge of any individual resource. The only resource that more than a third were familiar with was disability specific organizations, and approximately 3 in 5 of those familiar with them had actually used such an organization. One in 5 were familiar with the Job Accommodation Network (JAN) and nearly three quarters of those familiar had actually used it. The Job Accommodation Network (JAN) is a free consulting service that provides information about job accommodations, the Americans with Disabilities Act (ADA), and the employability of people with disabilities (janweb.icdi.wvu/). Slightly more than half of the 16% of those familiar with vendors of accessible computer software/hardware had actually used them as a resource. Respondents were least likely to be familiar with the World Wide Web Consortium (WC3), which develops interoperable technologies (specifications, guidelines, software, and tools) to lead the Web to its full potential (www.w3.org), and the Clearinghouse for Information Technology Accessibility (CITA), a part of the U.S. General Services Administration Office of Government-wide Policy that has been charged with the task of educating federal employees and building the infrastructure necessary to support Section 508 implementation (www.section508.gov) but, again, approximately half of those familiar had actually used them as a resource.

Organizational size did have an impact on awareness of two of the resources. Nearly a quarter of the respondents from the largest organizations (5,000+) reported to be very familiar with JAN, compared with less than 10 % of the other respondents. Eighty-six percent of those from the largest organizations who were aware of JAN had actually used JAN's services. Only a third of the smaller organizations (less than 500) were aware of disability specific organizations, while nearly half of the largest organizations (5,000+) were. Again, the largest organizations were much more likely to have used this resource (73% compared to 45%).

Approaches to Remove Technology Barriers

The respondents were asked to rate how helpful eight specific resources would be in removing technology barriers for applicants or employees with disabilities (training purchasing or procurement specialists in Internet access issues for people with disabilities, print information on

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Internet accessibility, telephone or e-mail expert consultation on Internet accessibility, Web-based resources on Internet/computer accessibility, computer training for potential employees with disabilities, uniform guidelines to make Web-based employer processes accessible, trained technical staff within the organization, or specific expertise or technical assistance on technology accessibility issues in the organization). The majority of the respondents saw all of them as potentially helpful. More than 7 out of 10 considered the following helpful: specific expertise or technical assistance on technology accessibility issues in your organization, trained technical staff within your organization, uniform guidelines to make Web-based employer processes accessible, and computer training for potential employees with disabilities. Interestingly, information in the form of telephone or e-mail consultation on Internet accessibility and print information was seen as slightly less helpful (66% and 61% respectively) than Web-based resources on Internet/computer accessibility (70%). Also of interest is that training purchasing or procurement specialists in Internet access issues for people with disabilities was least often rated as helpful by the respondents.

Conclusions

Results of this Cornell University research the Web site review and the subsequent HR professionals' survey of online/Web use in human resource processes illustrates the importance of making online recruitment and other human resources processes accessible for persons with disabilities. The majority of the HR representatives surveyed reported that online/Web HR processes are used extensively by their organization, with only 3% reporting not making use of these online technologies. Not surprisingly, larger companies were more likely to use these technologies and to a greater degree than smaller organizations. Many companies not using online HR technologies within their organization expected to in the near future. Given that access to human resource services are essential for all employees, the issue of potential barriers for applicants and employees with disabilities is evident. These findings not only have implications for people with disabilities, but also for the general workforce, which is aging.

It is encouraging that the resource most often identified as helpful in addressing computer/Web accessibility issues was the employee with a disability him or herself. It is important that HR professionals or other organizational personnel involved in the accommodation problem-solving process interact directly with the individual with a disability, as that person is often the most knowledgeable about his or her needs. Such an approach is also consistent with the intent of the Americans with Disabilities Act of 1990, which calls for the accommodation process to be an informal interactive problem-solving approach between employer and the individual with a disability.

It is also important to note that respondents indicated that they were not aware of the many excellent resources on information technology accommodations available. Organizations such as the Job Accommodation Network (JAN), the World Wide Web (W3C) Consortium, and the Center for Information Accessibility (CITA), which supports Section 508 implementation, must find additional or alternative ways to make their informational services available to those addressing to workplace accommodation questions.

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The ADA requires employers to make reasonable accommodations for applicants and employees with disabilities, and this includes providing accessible computer technology. Employers should be aware of barriers that computers can create, be familiar with the types of assistive technologies available, receive training in Internet and computer accessibility, understand the types of computer adaptations available, and know about the resource organizations available to provide technical assistance.

This research also illustrates how experience with accommodations or workplace adaptations can lessen the likelihood that disability will be perceived as a barrier. Therefore increasing the exposure of human resource professionals and supervisors to IT and other workplace accommodations for persons with disabilities may be very helpful. This can be accomplished through training, or by sharing across organizations successful stories of accommodation experiences. This consciousness raising can also be accomplished more directly by providing exposure to persons with disabilities through summer internships or mentoring programs for students with disabilities. Such programs can go a long way in lessening perceived barriers and/or ability limitations of persons with disabilities in the workplace, as well as providing youth with disabilities with valuable real world learning experiences.

In closing, as indicated by the results of this research, some of the specific recommendations for lessening future workplace IT barriers are as follows: increase the organization's specific expertise or technical assistance on technology accessibility issues; train technical staff about accessibility issues, promote uniform guidelines to make Web-based employer processes accessible; and provide computer training for potential employees with disabilities. Such proactive efforts toward removing technology barriers will go far to reduce the likelihood that claims of IT accessibility discrimination will occur.

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Endnotes:

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[2]A full report and a listing of publications stemming from this initiative can be found at the Cornell University web site at: http://www.ilr.cornell.edu/ped/daa/daa_survs.html?cat_id=2.

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