Technology Accessibility for All Floridians:

Ensuring Universal Access to the State of Florida's Electronic Information and Services

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Abstract

Technological innovations have significantly changed the way information is provided by government entities to their constituents. The convenience and cost-effectiveness of internet-based services has made it the preferred way to do business. However, many such online services are not accessible to everyone, particularly people with disabilities. In Florida, the goal of accessible e-government services has not been achieved due to a lack of training among the state employees who create the state's electronic content. Despite the numerous gains associated with the implementation of accessibility standards, the State of Florida will never realize their full benefit until state employees are provided the training and support needed to increase the accessibility of the electronic content they create.

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Introduction

With the advent and proliferation of the internet, the United States has seen an incredible surge in the use of technology to deliver government services to its citizens. Numbered are the days of lengthy paper applications and even longer processing times. People no longer wait *in line* to be given information – they now go *online* to find information. According to the 2002 E-Government Strategy Report, over 60% of internet users interfaced with federal government websites while surfing the web. The successful implementation of such services makes it easier to do business with government agencies, while reducing operating costs, and improving customer service (E-Government Taskforce, 2002). Similar models have evolved at the state government level to capitalize on these reported benefits.

MyFlorida.com is the official portal of the State of Florida, which provides a vast array of information and services for the state's citizens, visitors, and businesses. There are numerous e-government services listed on the portal, with links to every government agency in the state (Myflorida.com, 2008). Floridians can link to a wealth of information pertaining to any number of health, human, financial, and professional services – from birth certificates and death certificates to drivers' licenses and marriage licenses. By providing online access to such comprehensive information and services, Florida empowers its citizens to find the answers to their queries.

Yet what happens when the information provided by the state does not reach the entire audience? By law, all of Florida's citizens, visitors, and businesses are entitled equal access to e-government services (Online Sunshine, 2009). Unfortunately, just because much of Florida's electronic information and services are available online does not mean that content is accessible. What is accessibility and why is it important? Many people associate the term accessibility with

the Americans with Disabilities Act (ADA) of 1990. The ADA, a broad civil rights law, established standards prohibiting discrimination against individuals with disabilities, specifically targeting equal opportunity employment and equal access to physical environments (ADA, 2009).

In the broadest sense, accessibility is a feature of a product or environment reflecting its degree of usability. Usability is a measure of how effective that product or environment is at achieving user goals. Consequently, that product or environment can be considered accessible if it can be used by everyone. The discussion of accessibility issues often centers on the needs of individuals with disabilities. What constitutes a disability? For the purposes of this research, a disability is a condition that partially or entirely, temporarily or permanently, lessens a person's ability to accomplish normal pursuits. Simply put, disability can be viewed as the incompatibility between the people and their environments (Wadell, 2005).

In his book *Accessibility for Everyone*, author John Paul Mueller (2003) takes issue with the term "disability," noting that the definition of the word, when dissected, literally means "not able" (p. 8). Instead, Mueller prefers to think of accessible design as a thoughtful solution for individuals with "special needs," which has the capacity to *en*-able, rather than *dis*-able (p. 8). Furthermore, and central to the argument supported by his research, is the notion that accessibility benefits everyone, not just those with disabilities. For example, although the redesign of sidewalks to include curb cuts was a special accommodation made for wheelchair access, people pushing strollers or riding bicycles also benefited. "These same types of benefits occur when developing information products with accessibility in mind" (Jacobs, 2008, ¶ 1).

Careful examination of the State of Florida's current level of accessibility, within the context of legal requirements and ineffective business processes, reveals lack of awareness and a

training deficit among many state employees, the individuals responsible for creating a large amount of the information and services found on the state agency websites. A solution, seeded in educational awareness and technical training, is needed to bring the State of Florida into compliance with its own laws and guide the state toward an accessible future.

Thesis Statement

If the State of Florida is to ensure that all its electronic information is accessible, then it stands to reason that the state employees who create that content must be properly trained. However, many state employees are unfamiliar with technology accessibility issues and are unaware of the state's legal obligation to ensure universal access to its electronic information and services. The development of an asynchronous, online training module is a viable, efficient, and cost-effective solution to increase state employee awareness about technology accessibility concepts and laws, and provide instruction on techniques for increasing the accessibility of electronic information.

Educational Significance

The answer to the State of Florida's problem ensuring the accessibility of its electronic information and services lies in the education and training of the employees who are responsible for creating that content. Pickett (personal communication, September 17, 2009) noted, aside from webmasters, the majority of Florida state employees have never been introduced to accessibility concepts within the context of their professional working environments or within the demands of their job-related tasks. The development and implementation of an online training module will afford the State of Florida the opportunity to comply with accessibility law, to meet the social responsibility of ensuring equal access for persons with disabilities, to take

advantage of the technical gains associated with accessible electronic content, and to realize financial savings from the reduction of both direct and indirect costs.

Definition of Terms

ACTIONS Model. Developed by Tony Bates, an expert in the management of e-learning endeavors, the ACTIONS Model serves as a framework for planning educational media technology applications within a given context. ACTIONS is a acronym for Access – Costs – Teaching and Learning – Interactivity and Usability – Organizational Issues – Novelty – Speed (Mishra, 2007, ¶ 3). Each component of the ACTIONS model is analyzed in the design and development of e-learning curriculum.

Accessibility. Although the term is commonly understood as the navigability of a physical environment for persons with disabilities, Iwarsson and Stahl (2003) frame accessibility as a relationship between all people and their environments, noting accessibility is a precursor for usability.

Assistive Technology. Assistive technology enables individuals with disabilities to access information technology through the use of specialized hardware, software or other peripheral devices (AccessIT, 2009). Examples of assistive technology include screen readers, text telephones (TTY) and enlarged keyboards.

Asynchronous E-Learning. Asynchronous e-learning is a flexible, learner-centered educational delivery method, where learning materials are always available to students. Although an instructor need not be present, Hrastinski (2008) adds asynchronous e-learning "supports work relations among learners and with teachers [sic], even when participants cannot be online at the same time" (¶ 4).

Gatekeeper Model. First developed by social psychologist Kurt Lewin, the gatekeeper model describes the regulated flow of information as controlled by one person – the gatekeeper (University of Twente, 2006).

Remediation. Within the framework of this discussion, remediation is the process by which the format or delivery of inaccessible material is altered or augmented into an accessible form.

Technology Accessibility. Technology accessibility focuses on making electronic information easier to see, hear, understand, and use. Electronic information can be considered accessible if it can be universally obtained by all people and all machines, which includes search engines and mobile devices.

Universal Design. According to Mace (2008), "Universal design is the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design" (¶ 1).

Usability. Usability is a quality of user experience. It measures the degree to which a product or device allows users to achieve their interaction goals and their overall ease or satisfaction with the process (United States Department of Health & Human Services, 2009).

Literature Review

Legal Factors

Providing equal access to electronic information is the right, ethical thing to do; however, it is also a matter of law. Section 508 of the U.S. Rehabilitation Act of 1973 was amended in 1998, mandating the federal government ensure universal access to information technology by removing access barriers for individuals with disabilities (Section 508, 2009). Section 508 is the federal law from which Florida's accessibility law was eventually adapted.

Prior to the development and implementation of accessibility legislation in Florida, Governor Jeb Bush signed an executive order creating the Accessible Electronic Information Task Force to research the state's level of accessibility compliance, develop policy recommendations, and establish implementation timelines (AeIT Task Force, 2006). Based on the task force's recommendations, in 2006 the Florida Legislature passed the Accessible Electronic Information Technology (AeIT) Act, adopting many of the standards set forth in Section 508, requiring Florida state agencies to provide equal access to electronic information and services (Online Sunshine, 2009). Although the legislation was passed, accessibility concepts were not introduced to state employees nor were any steps taken to train state employees on how to comply with the new requirements. The development and implementation of online technology accessibility training for Florida state employees is justified within the legal mandate of the AeIT Act.

Section 508 and Florida's AeIT Act only apply to government institutions. These laws have no bearing on public or private websites. Although there is no law requiring private entities to remediate electronic content into an accessible format, many legal challenges have been raised by individuals with disabilities claiming discrimination under the protections of the ADA. In 2008, the National Federation of the Blind (2008) settled a class-action lawsuit with the retail chain store Target® over the accessibility of its website.

Two years after Florida's passage of the AeIT Act, West (2008) analyzed over 1,500 websites to assess whether federal and state governments were taking advantage of the interactivity of the web to "improve service delivery and public outreach" (p. 1). On average, 30 websites from each state were evaluated on the basis of availability or presence of publications, databases, audiovisual components, foreign language access, advertisements, privacy/security

policies, payment transactions, personalization, comment fields, e-mail contact information, and accessibility for individuals with disabilities or personal digital assistants.

Of the 50 states, impressively, Florida ranked third in overall scope or comprehensiveness of its e-government services. Although Florida ranked very high in providing a multitude of electronic information and services online, not all content was accessible. In fact, West (2008) found that only 10% of the Florida government websites surveyed were accessible to individuals with disabilities and personal digital assistants. West's findings confirm the need to educate state employees on accessibility concepts and laws, and train them on techniques to increase the accessibility of the electronic content they create.

Rubaii-Barrett and Wise (2008) attempted to explain why some states are more responsive to accessibility issues in their use of e-government services by analyzing four potential factors: demographics, politics, policy administration, and economy. Rubaii-Barrett and Wise found the strongest factor determining access to e-government services was the stringency of each state's technical assistance policy, also noting, however, that "having a policy in place at the state level is not sufficient to assure that the purposes of that policy are implemented" (p. 57).

Although Florida's technical assistance policy is well outlined by the AeIT Act, it is an unfunded mandate. The implementation and monitoring of this policy has not been successful due to the lack of dedicated financial resources and buy-in support from agency leadership. Rubaii-Barrett and Wise's study supports the contention that the State of Florida can increase the accessibility of its electronic content by offering more practical implementation methods, such as online training and the adoption of accessibility standard by state employees.

Social Responsibility

Accessibility benefits everyone, especially individuals living with disabilities. The Web Accessibility Initiative (2009c) advises that as online information and services begin to replace more traditional resource delivery methods, it is imperative to ensure equal access to people with disabilities. The implementation of online technology accessibility training for State of Florida employees would be a major step toward that goal.

The 2007 Disability Status Report identified the percentage of the Florida's disabled population potentially affected by accessibility issues. According to the report, in 2007, 12.1% of Floridians ages 21-64 were living with some form of disability. That percentage jumped to 27.2% for Floridians ages 65-74 and soared to 49.3% for Floridians over 75 years old (Erickson & Lee, 2008). It is important to note those percentages only reflect *Florida's* disabled community, and do not account for anyone outside the state trying to access Florida's e-government services online.

Prior to the passage of Florida's accessibility legislation, Wadell (2005) addressed the marginalization of the disabled population in a presentation given to the AeIT Task Force. Her presentation focused on the impact state technology choices have upon the disabled community and illustrated how accessibility issues affect everyone, not just individuals living with disabilities. Wadell (2005) noted:

> Unless the accessible design and usability of technology is addressed by the state, persons with disabilities will continue to be isolated and locked out from participation in society on the basis of disability and society will not be enriched by [their] diverse contributions. (p. 14)

Wadell (2005) proposed a social model of disability rather than a medical one, distinguishing between physical and environmental disabilities. For example, a man may be unable to see because he is blind (physical) or because he is in a dark room (environmental). A woman may be unable to hear because she is deaf (physical) or because she is in a noisy restaurant (environmental). Including environmental factors in the definition of disability casts a much wider net for catching potential accessibility problems and reveals an even greater need for awareness education and technical training in this area.

Of particular relevance to the State of Florida, long recognized as a popular retirement destination, are a growing number of age-related accessibility issues. As noted by the Web Accessibility Initiative, "older users with age-related accessibility needs are an increasingly important customer base for [government agencies], as the percentage of older users is increasing significantly" (2009a, ¶ 2). According to Street (2007), of all the 50 states, Florida has the largest percentage of elderly residents, individuals aged 65 and older.

Even by the most conservative estimates and the narrowest of definitions, millions of people with disabilities either benefit from accessible information technology or are at a disadvantage when their special needs are not considered. The State of Florida can address these needs by fostering an awareness among state employees of the technology accessibility challenges faced by individuals with disabilities and by offering technical training on how to remove virtual barriers to electronic information.

Technical Gains

By reinforcing accessibility standards through the training of state employees, Florida state agency websites will also benefit from improved technical performance. According to the Web Accessibility Initiative (2009d), the implementation of such standards can reduce site

development and maintenance time, reduce demands on bandwidth, enable electronic content on different system configurations, and equip the state to take advantage of emerging technologies through the re-use of accessible content.

With the continued growth of the mobile technology industry, the interoperability and device-independence of electronic information will become increasingly important (Web Accessibility Initiative, 2009d). The inability to view an attachment from a Blackberry® or an iPhone® is an accessibility issue that can addressed through the implementation of technology accessibility standards. Furthermore, accessible electronic information and services increases the "findability of web pages by exposing content to search engines, both internally (within a website) and externally (across the World Wide Web)" (Web Accessibility Initiative, 2009b, ¶ 4).

Financial Considerations

The Web Accessibility Initiative (2009b) suggests there are potential financial gains, direct and indirect savings, associated with the implementation of accessibility standards. The expense of developing online technology accessibility training for state employees is duly justified by the ever increasing demand for e-government services, the increased productivity resulting from the ability to repurpose accessible content, and the reduced maintenance costs. As such, the state's effort to ensure the accessibility of its electronic information and services through education and training can yield a positive return on any initial financial investment (Web Accessibility Initiative, 2009b).

The implementation of online technology accessibility training for Florida state employees, as pointed out by the Web Accessibility Initiative (2009b), may also produce

financial savings by decreasing the risk of the costly expenses associated with legal action taken against the state for non-compliance with accessibility laws.

Current/Past Solutions

Historically, a gatekeeper model has been employed to monitor the accessibility of the electronic information and services provided on Florida state agency websites. Although traditionally applied to communications, the model has been incorporated across multiple disciplines (University of Twente, 2006). Within state government, the idea of gatekeeping has been adapted to describe the controlled flow of information from the content creators - State of Florida employees, to the intended audience - the public. Inside this framework, state webmasters function as gatekeepers to audit the accessibility of the information compiled by state employees prior to posting that information on state websites. As the gatekeepers, the responsibility of remediating inaccessible content created by state employees falls on webmasters since they are the only group of state employees to receive any formal training in this area.

The problem with the gatekeeper model as a business process to regulate the accessibility of electronic information is two-fold. First, the goal of accessibility is more easily achieved during the creation process, as opposed to remediating that content at a later point in time. Depending on the format, Pickett (personal communication, September 17, 2009) advised that remediating inaccessible content may take as much as twice as long as creating it accessibly from the start. Thus, remediation is an inefficient way to do business. As such, the employees who create electronic content for the state must share the responsibility of making it accessible with the webmasters who post it. To that end, state employees must be properly trained. Secondly, with thousands of employees creating inaccessible content and only a handful of

webmasters remediating it, there is an evitable clog in the flow of information, resulting in a delay in the public availability of that information.

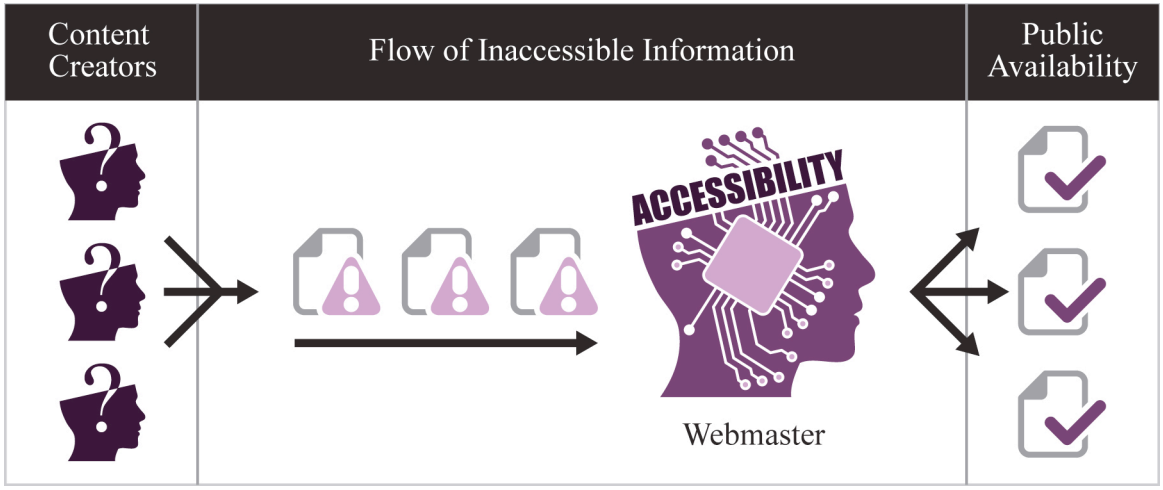

Figure 1. Inefficiencies in the flow of information using the gatekeeper model to ensure the accessibility of electronic content.

Educating Florida state employees about the importance of accessibility issues and training them on how to make the content they create accessible, effectively transfers the onus from few to many. According to Pickett (personal communication, September 10, 2009), many state agencies are moving away from the gatekeeper model due to this clog in the flow of information. Unfortunately, this is an incomplete solution as it allows inaccessible content to be published without the gatekeeper's oversight.

Proposed Solution

The implementation of online training for Florida state employees is a viable solution to increase awareness of the concepts and laws surrounding accessibility, as well as provide instruction on techniques for increasing the accessibility of electronic information. Using Bates' ACTIONS model as a framework for development decisions will yield an efficient and cost-effective curriculum design.

The ACTIONS model assesses the design of new e-learning models, such as asynchronous online training, through the detailed consideration of the access, costs, teaching, interaction, organization, novelty and speed (Bates, 1995). Deeson highlights that by examining these specific areas, the most appropriate technology or media resources can be matched to specific training objectives (2006).

When developing a new training model, Bates (1995) stresses the importance of the flexibility of the technology chosen to deliver the curriculum. He notes, "The appropriateness of online learning will depend very much on the [group] being targeted" (p. 131). Since all Florida state employees who create electronic content have direct or indirect access to computers and the internet, an online format for the proposed accessibility training is an appropriate choice. The flexibility of this delivery method will allow the State of Florida to host the training at a central location on the web. Every state employee with access to the internet would have access to the training. Bates notes, "Easy access to computers, accessible, reliable and cheap internet service, and low cost telecommunications are all important requirements for the successful implementation of e-learning" (Resta, 2005, p. 13). Clarke and Hermens concur (as cited in Bartley & Golek, 2004), adding that online education also produces the benefit of scalability. As such, the proposed online training module could be modified given any changes in the learner, task, or context variables.

In their book *Multimedia for Learning*, Alessi and Trollip (2001) articulate the logistical value of incorporating technology into training:

> Materials can be distributed more cheaply and easily; it is easier to ensure that all users have the most recent version of the materials; learners can access the materials at their

> convenience; accessibility is facilitated for people with disabilities; and dangerous, expensive, or unique environments can be simulated to improve access. (p. 5)

Given the current economic reality, the State of Florida's response to any training or continuing education need must be cost-effective. By providing the proposed accessibility training online, the state can eliminate both the costs associated with contracting an instructor and the costs associated with traveling to a central training location. The State of Florida will not incur the additional costs of purchasing computer equipment or acquiring bandwidth resources since the technology infrastructure for online learning is already in place. Bartley and Golek (2004) note that online training also reduces the amount of time employees are taken away from other job-related responsibilities.

In order to satisfy the objectives for the proposed training, state employees will be required to synthesize general knowledge of accessibility concepts and laws with the application of technical skill in the creation of electronic content. Online instruction will take the form of an asynchronous computer-based training module, where a teacher need not be present and learning materials are always available to students for reference or review. Bartley and Golek (2004) observe that a student-centered approach offers learners "more control with course pacing, sequencing and styles" (p. 170). Bates (1995) points out that interaction is highly controlled in asynchronous learning environments "where learners can be tested, corrected, or given remedial activities by the computer" (p. 218).

Since Florida state employees are adults, it is important to consider characteristics specific to adult learners in the development of the proposed online training module. Since adult learners are autonomous, practical, and relevancy-oriented, the proposed technology accessibility

training will be self-paced, organized into clearly defined objectives, and be applicable to an employee's daily work (Rochester Institute of Technology, 2009).

Cognitive teaching strategies emphasizing attitude, memory, thinking and reflection will be used to introduce state employees to accessibility laws and concepts, whereas objectivist methodologies, including step-by step demonstrations and tutorials, will be used to teach techniques for increasing the accessibility of electronic content (Alessi & Trollip, 2001). Bates (1995) notes, "Students need to be aware of the epistemological requirements of a subject and ensure their understandings are consistent with the rules for validating knowledge in the subject area" (p. 144). The foundation of the curriculum will be based on accessibility standards established by the World Wide Web Consortium's Web Accessibility Initiative (2009e) and the state guidelines compiled by the Technology Accessibility for All Floridians subcommittee (Technology Accessibility for All Floridians, 2009). Their recommendations will guide the content development of the proposed online training module designed to teach state employee techniques for increasing the accessibility of electronic content.

One of the leading benefits of providing the proposed technology accessibility training online is that state employees will be training in the same environment in which they will ultimately be required to demonstrate the mastery of their newly acquired skills. Alessi and Trollip (2001) warn the transfer of learning can be difficult for users of multimedia, computer-based instruction, citing that limited interaction, "such as typing and moving the mouse, tend to impede transfer when compared to classroom and on-the-job instruction" (p. 30). However, in the case of the proposed technology accessibility training, computer-based instruction and practice will undoubtedly increase the transfer of learning as the skills state employees will be

required to master are also computer-based. As such, the techniques demonstrated in the technology accessibility training can be immediately applied on-the-job.

Florida state employees already use computers and various software applications in the creation of electronic content as a part of their daily job-related tasks. Such experience will help facilitate interaction with these familiar technologies and promote usability in the proposed accessibility training. Furnell acknowledges that online training affords learners the opportunity to expand their skill set by empowering them with tools and resources that might not have been otherwise available (as cited in Bartley & Golek, 2004).

Technology accessibility removes barriers to learning by providing information in useable formats. By providing the proposed online technology accessibility training in a mixed media format, the widest possible audience of learners will be reached. Gardner (1999) observes: "We are not all the same; we do not all have the same kinds of minds. ... and education works most effectively if these differences are taken into account rather than denied or ignored" (p. 91). A rich combination of graphics and videos will be used alongside the presentation of key concepts and terminology in a written format. Additionally, step-by-step tutorials will be used to demonstrate or model techniques for increasing the accessibility of electronic content. Bartley and Golek note (2004) "The challenge is to transform a simple printed lesson transmitted via computer technology into an exciting online classroom with powerful interactive features for the learner" (p. 174).

Integration of the Proposed Solution into the Current Paradigm

With the technological infrastructure required to offer online training already in place, the State of Florida can move quickly and cost-effectively toward the development and implementation of an online training module designed to provide state employees with the

information and techniques necessary to increase the accessibility of the state's electronic content. Such training can be incorporated in the state's new employee orientation program and as a part of each agency's continued educational or professional development.

By providing such instruction, state webmasters no longer need to act as the gatekeepers between electronic content and its availability to the public. The need for time-consuming remediation will dissipate as state employees begin to apply the knowledge gained in the proposed technology accessibility training on the job. As a result, state webmasters and employees become equal contributors in the creation of accessible electronic content, sharing the responsibility of ensuring the accessibility of that content, and, in the process, providing more inclusive, timely and relevant information to the citizens of Florida.

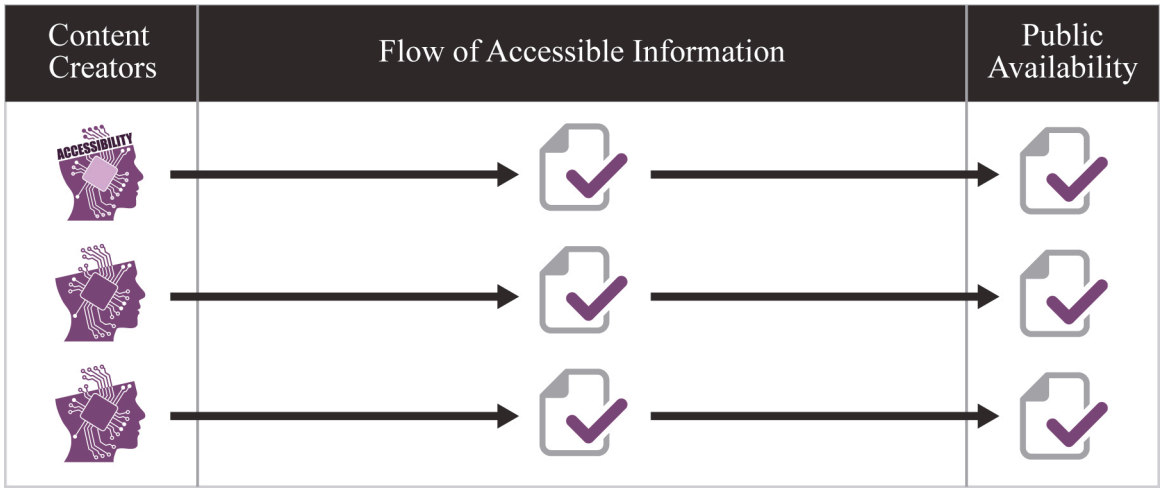

Figure 2. The flow of information from creation to posting becomes more efficient with collaborative content contributions from state webmasters and employees.

Conclusions

The development and implementation of online technology accessibility training for state employees is the first step in offering better, more inclusive electronic information and services to all Floridians. Accessibility starts at the level of creation, which is why the people who

generate the content need to be trained on how to make it accessible. There are countless advantages to the application of accessibility standards in the delivery of e-government services. Through the education of its employees, the State of Florida can comply with accessibility law and, at the same time, meet its social responsibility to ensure equal access to electronic content for people with disabilities. As a result, the state may also take advantage of the technical gains associated with accessible electronic content and capitalize on identified financial savings.

This movement toward universal access will continue to gain momentum as more content is created and shared electronically online. Not only is it imperative that all people be able to access this information, but it will become increasing important for machines and devices, such as search engines and portable digital assistants, to be able to access electronic content. Due to their convenience and relative low cost, such devices, particularly smart phones, are quickly becoming the preferred method of accessing information online.

The global application of technology accessibility education is limitless. By definition, electronic information that is accessible can be obtained by anyone or anything, anywhere. While the online technology accessibility training proposed by this research is intended for Florida state employees, the concepts and techniques taught in the training can be applied across multiple disciplines.

Specifically as the topic relates to education, there are a vast number of accessibility considerations of which every curriculum designer, instructional designer, and teacher should be aware. Usability is at the heart of all accessibility issues and, ultimately, if the design of a lesson or training is not usable, then it is not effective.

Suggestions for Future Research

The effectiveness of the proposed online technology accessibility training should be measured through pre- and post-training assessments of participating state employees. Based on the analysis of those results, the curriculum and its delivery media should modified to achieve the training objectives. Additionally, as technology continues to evolve, so will accessibility standards, and so must the proposed training curriculum. Course designers will need to continually monitor accessibility trends to remain in compliance with state law and ensure the content of the proposed training is in alignment with the recommendations of both the Web Accessibility Initiative and the Technology Accessibility for all Floridians subcommittee.

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