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The Relationship Between Web Accessibility Policy and Practice in Postsecondary Institutions

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THE RELATIONSHIP BETWEEN WEB ACCESSIBILITY POLICY AND PRACTICE IN POSTSECONDARY INSTITUTIONS

by

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B.S., Southern Illinois University Carbondale, 1993
M.S., Southern Illinois University Carbondale, 1999

A Dissertation
Submitted in Partial Fulfillment of the Requirements for the
Doctor of Philosophy Degree.

Graduate Program in Educational Administration
Department of Educational Administration
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Southern Illinois University Carbondale

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DISSERTATION APPROVAL

THE RELATIONSHIP BETWEEN WEB ACCESSIBILITY POLICY AND PRACTICE IN POSTSECONDARY INSTITUTIONS

By

Michael P. Whitney

A Dissertation Submitted in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy in the field of Educational Administration

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TITLE: THE RELATIONSHIP BETWEEN WEB ACCESSIBILITY POLICY AND PRACTICE IN POSTSECONDARY INSTITUTIONS

MAJOR PROFESSOR: Dr. Kathy Hytten

From computer workstations to the world of the web, statutes and policies have afforded students with disabilities the right to participate in postsecondary education in a non-discriminatory manner. Automatic doors and adjustable tables are a commonplace on campuses and represent prime examples of accessible policy adherence, but what affect do accessible website design policies have on practice? The answer is monumental for the students with disabilities that rely on the integration of electronic curb cuts into institutional websites.

In 2006, Illinois Board of Higher Education required public postsecondary institutions to develop and implement a website policy, report on the accessibility of their websites and continuously improve throughout the year. In response, multiple policies and practices were implemented throughout the state. As to how effective this requirement was and which variables influenced policy decision and implementation is the purpose of my study.
Through a mixed method approach, I examined the relationship between web accessibility policy and practice. Quantitatively, descriptive statistics in conjunction with a paired t-Test were used to examine the amount of change in the accessibility pass and fail rates of all 12 Illinois postsecondary institutional homepages from January 2006 until January 2007. In addition, quantitative data were used as a means to identify trends such as pass and fail rate spikes and drops. Qualitatively, autoethnographic practices and document analysis were implemented to bring focus as to why these changes and trends might have occurred.

By implementing this mixed methodological approach, I was able to identify a statistically significant change in the overall statewide pass rate. In addition, three prominent trends were discovered. The first was a spike trend where accessibility pass rates spiked just before deadlines. The second was a high standard, high accessibility rate where institutions that incorporated a high standard ended up being the most accessible of all the state institutions. The third was a low standard, high accessible illusion trend. Here, institutions incorporated a low standard then stopped accessibility development when the standard was met. This afforded institutions the
opportunity to report a high pass rate when assessed with their low standard rather than a low pass rate against a more stringent standard.

The implications of this study are many. Of paramount importance is that policy is not always incorporated into practice as it was intended. This is evident with the low standard, high accessible illusion trend. The intent of the policy in this study was for continuous improvement. However, when institutions reported 100% compliance to a low standard, they were also able to report that there was no need for improvement. Consequently, if a policy is to succeed, such behavior needs to be taken into consideration and appropriately addressed.
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CHAPTER 1
INTRODUCTION

As the world moves toward a ubiquitous computing environment, United States postsecondary institutions continuously reform their technological policies and practices in an effort to stay at the forefront of society’s technological needs and pressures. This continuous modification helps facilitate an institution’s ability to attract and support an expectantly diverse, technologically savvy, generation. Unfortunately, architects of this evolving electronic world might inadvertently overlook the needs of persons with disabilities and deny them access to all that higher education institutions have to offer.

Similar to providing equal access to a building through ramps and accessible doors, there exist techniques for creating electronic “curb cuts,” which ensure that individuals with a disability are not restricted from accessing electronic resources. Considering that one in three persons with disabilities depend on technology for his/her independence (National Organization on Disability, 2004) and this population constitutes 10% of the student body (National Council for Disability, 2003), it behooves postsecondary institutions to understand and implement
appropriate accessible website design practices to ensure a welcoming environment for all.

**Purpose of the Study**

A multitude of complex variables exist surrounding accessible web offerings. From adhering to statutes, administrative regulations, and directives to deploying accessible web media, the path to doing this appropriately involves a wide range of options for consideration. With this in mind, I intend to examine the magnitude of the gap between accessibility requirements and actual practices of accessible website deployment. More specifically, the purpose of this study is to examine the relationship between the accessibility of Illinois postsecondary institutional homepages and the Illinois Board of Higher Education (IBHE) requirements for institutions to implement web accessibility standards and continuously improve website accessibility. These actions were initially required to be reported on as part of the winter 2006 annual Underrepresented Groups Report (Illinois Board of Higher Education, 2008a). IBHE compiles this report which is based upon the status of students with disabilities, female students and minority students as reported by public college and universities, and presents it to the Illinois Governor and General Assembly (Illinois Board of Higher
Education, 2008b). In an effort to examine the magnitude of the gap between accessibility requirements and actual practices of accessible website deployment, I developed the following research questions:

1. To what extent did Illinois postsecondary institutional homepages meet accessibility guidelines at the start and end of the IBHE 2006 accessibility reporting requirements?

2. What factors might have influenced changes in website accessibility over time?

**Theoretical Framework**

Institutional theory appears to be the most useful framework for this research because of its strong ability to explain organizational action (Dacin, Goodstein, & Scott, 2002). It does so by focusing on how organizations respond to internal and external normative pressures (Zucker, 1987). The organizational response to these pressures is “characterized by the elaboration of rules and requirements to which individual organizations must conform if they are to receive support and legitimacy” (Scott & Meyer, 1983, p. 140). Ultimately, the institutionalization of these responses in a support and legitimacy-gaining manner leads to an isomorphism or homogenization of the
institutional environment (Hanson, 2001; Zucker, 1987). In other words, institutions become similar because they react in a similar fashion.

Institutional theory also promotes the homogenization of the institutional environment. Of importance is the postulation of a top-down approach where each layer of authority influences, if not controls, the independent action of successive layers. In 1995, Scott presented on how the top-down perspective

generalized models—beliefs, norms, menus, and scripts—flow “down” through the various levels, carried by socialization, social construction, and sanctioning powers. These models are carried and reproduced, but also modified and reconstructed, by the interpretations and inventions of subordinate actors: individuals, organizations, and fields (p. 141).

So, as institutions react to external pressures in pursuit of support and legitimacy, internal members are constrained in the choices they make.

Furthermore, conformance to rules and requirements is not necessarily done primarily for the purpose of internal improvement, but instead for the purpose of the improvement of legitimacy and resources (DiMaggio & Powell, 1983). Institutions make certain changes because they are being
rewarded for doing so (Meyer & Rowan, 1977). Unfortunately, school organizations go to the greatest lengths, not to accomplish instructional ends, but to maintain their legitimate status as schools. They seek accreditation, which depends on structural conformity with a set of rules that are professionally specified and legally mandated, and react in panic when it is threatened. (Meyer, Scott, & Deal, 1992, p. 54)

As Scott (1995) described, one perspective found in institutional theory is a top-down approach. Because of this, institutional employees have to react to the needs of the institution under constraint rather than in a free manner.

In 2006, Illinois postsecondary institutions were required to conform to IBHE’s rules and requirements. With this in mind, I intend to use institutional theory as a theoretical lens so as to better frame my findings and discussions. By doing so, I will be afforded the opportunity to draw focus statewide institutions as a whole as well as individually examining the actions of each individual institution.

**Significance of the Study**

As postsecondary institutions race to keep up with society’s technological movement, they are finding out that
accessibility responsibilities are an integral piece to their academic offerings (Byerley & Chambers, 2002). From computer workstations to the world of the web, students with disabilities have the right to participate in a non-discriminatory manner. In order to provide an equal opportunity for these students and avoid litigation, it is imperative that institutions address the issue of accessibility through the utilization of sound policies and practices. This is not a simple task because a vast number of issues can impact the development and implementation of equal access policies and practices.

Understanding discrepancies between policies and actual practices will help institutions to better respond to existing federal and state statutes and guidelines, and to the Office of Civil Rights (OCR) findings related to accessibility. More specifically, this research will provide policymakers, administrators and web designers with some perspective on whether or not policy has an affect on accessible website design practice. If accessibility policies are not taken into consideration during this technological evolution, institutions are not only going to lose out on a large population of students seeking equal access, but they might also find themselves expending resources while “playing catch up” in both the classroom
Delimitations of the Study

In this research, I will institute restrictions in an effort to narrow the scope of the study. As such, I have delimited my research with the following conditions:

1. Only Illinois public universities as listed on Illinois Board of Higher Education's 2006 website are eligible to be in the homepage evaluation population (Illinois Board of Higher Education's, 2006a).

2. The University of Illinois at Urbana-Champaign (UIUC) Functional Accessibility Evaluator (2008) will serve as the mechanism to evaluate the accessibility of institutional homepage websites.

3. The Wayback machine (Internet Archive, 2007) will serve as the sole instrument for obtaining the archived institutional homepage website data.

Researcher Positionality

Being a disability support professional as well as an adaptive technology and accessible web design instructor, I have been afforded many opportunities to observe, interact with, and influence the state of electronic accessibility in Illinois. As early as 1996, I experienced students affiliated with disability support offices around the state reporting difficulties accessing course-based web
materials. As a member of the Illinois Board of Higher Education Disability Advisory Committee, I helped Illinois’ postsecondary educational system identify this problem and take steps to create a more accessible learning environment for students with disabilities. I also assisted with drafting the web accessibility requirements that were implemented and are playing a key role in this research.

In addition to assisting with the web accessibility requirements, I helped to secure and serve as Principal Investigator, Project Director, Fiscal Officer, and Coordinator on six grants focused on educating Illinois postsecondary institutions on the creation, assessment, and deployment of accessible websites. Over the past several years, I have trained hundreds of individuals representing their respective postsecondary institutions throughout Illinois. I draw upon and build from this knowledge base while conducting this research.

**Overview of the Study**

The remainder of this work consists of four chapters. In chapter two, I review pertinent literature on web accessibility research as well as statutes, influencing bodies of authority, mandates, accessibility guidelines, and compliance as defined by the Office of Civil Rights. In chapter three, I address the methodology of the research
including the population selection, accessibility guidelines, data collection, and data analysis. In chapter four, I present and analyze the data and in chapter five, I offer a discussion of the findings, conclusions and recommendations.
CHAPTER 2

REVIEW OF LITERATURE

The focus of this research is to examine the accessibility of Illinois postsecondary websites for persons with disabilities. In an effort to depict a broad representation of current research on website accessibility, I begin at a foundation level and review pertinent statutes and guidelines. I then look at website accessibility studies, barriers to implementation, and issues of legislative compliance. Finally, I look at the affect of inaccessible media on students with disabilities and institutions as examined by the Office of Civil Rights. My goal is to present a broad picture of the myriad of issues related to website accessibility for the persons with disabilities.

Disability Statutes

Civil Rights statutes theoretically afford many individuals the opportunity for equal treatment regardless of their differences. Yet, for a person with a disability, the particular differences need to be addressed in order to ensure equal treatment. For example, the racial status of an individual should not result in different treatment in order to accomplish a task such as typing a letter in a computer lab. Yet, a person who utilizes a wheelchair might
need a desk that is high enough to accommodate the height of their wheelchair in order to access the keyboard. If the individual was not provided access to the keyboard, then they did not receive equal access to the computer. So, in order to overcome such scenarios, disability statutes identify a range of differences and establish policies for fair treatment through the utilization of reasonable accommodations.

Disability statutes not only aim to secure equal opportunities, but also to enable participation on a more level playing field. In order to understand how fair treatment for persons with disabilities can be achieved, we need to look at the three most common disability statutes. These are Section 504 of the Rehabilitation Act of 1973, Title II of the 1990 Americans with Disabilities Act, and Section 508 Rehabilitation Act Amendments of 1998.

**Section 504 of the Rehabilitation Act**

As a disability professional, I have participated in many discussions about how in the early 1970’s, persons with disabilities enjoyed some degree of civil rights protection because they received consideration for postsecondary education on a much larger scale than historically available. Schools started opening their doors and accepting a population of students that were not
considered the typical campus participants.

Unfortunately, being accepted into an institution of higher education alone did not constitute equal access. This became apparent to people utilizing wheelchairs when they arrived on a campus with no curb cuts or ramps. Of course, individuals who were blind might have struggled with no materials being represented in a tactile format such as Braille door signage or individuals who were deaf accessing an instructor’s spoken lecture. While these are just a couple of examples of issues as shared through exploratory discussions with disability professionals working during that time period, there were many more that caused a separation between a person with a disability and equal access to academic offerings.

In 1973, Congress addressed the issue of unequal access and passed Section 504 of the Rehabilitation Act (29 USC § 794, 2009), which prohibits discrimination based upon a person’s disability. To further, Section 504 of the Rehabilitation Act states that

No otherwise qualified individual with a disability in the United States, as defined in section 7(20) [29 USCS § 705(20)], shall, solely by reason of her or his disability, be excluded from the participation in, be denied the benefits of, or be subjected to
discrimination under any program or activity receiving Federal financial assistance. (p. 1)

What this meant for individuals with disabilities is that if they were capable of accomplishing a specific task with the removal of barriers, such as a low desk, then they could not be excluded from participating in any program or activity available from an organization receiving federal financial assistance such as a university (U. S. Department of Education, 1998).

This statute gave individuals with disabilities the power to demand both literal and metaphoric curb cuts. In my experience, Section 504 of the Rehabilitation Act of 1973 is still the driving force when considering equal access policies and practices at postsecondary institutions.

**Title II of the Americans with Disabilities Act**

Similar to the Rehabilitation Act of 1973, Title II of the 1990 Americans with Disabilities Act (42 U.S.C.S. § 12101 et seq., 2009) built upon and strengthened disability protection. It is typically the most verbally and textually referenced piece of legislative protection by many disability specialists. Of particular importance, Title II of the Americans with Disabilities Act of 1990 (ADA) further developed previous disability statutes by providing
individuals with a disability with the right to sue.

Prior to this Act, the punishment for discriminatory practices was possible loss of federal funds if the practice went un-corrected. Unfortunately, there was also a need for a student with a disability to enter into a long drawn out legal procedure that might take longer than the expected time of graduation. The ADA also addressed new avenues of equal access by identifying the importance of appropriate communication and equivalent access to information. In doing so, equal access to technology and its offerings started to become a more focused fixture in what institutions should consider and implement in an inclusive environment.

In addition, Title II of the ADA required institutions to develop self-evaluation plans that include evidence of what the institutions have considered in terms of disability access to their academic offerings. At this time, while the specifics of electronic access were not addressed, institutions were required to endure that communications were equally effective for persons with and without disabilities (Waddell, 1999). In doing so, the Title II of the ADA crafters had structured an equal electronic environment framework.
**Section 508 Rehabilitation Act Amendments of 1998**

In the years since the passage of the Rehabilitation Act and the Americans with Disabilities Act, the technological front had drastically changed. By the mid 1990's, any technological guidance found in the two statutes was outdated and ambiguous. Efforts to close this gap through a more direct inclusion of electronic technology led President Clinton to sign Section 508 of the Rehabilitation Act Amendments of 1998 (29 USC § 794d, 2009), which addresses electronic accessibility through the creation of Section 508.

Section 508 of the Rehabilitation Act Amendments of 1998 (29 USC § 794d, 2009) directly, but not solely, focuses upon the means for disseminating information through the utilization of electronic technologies such as computers, software, and the World Wide Web. This statute was and is still relevant in 2009 to agencies receiving federal funds when they develop, procure, maintain, or use electronic and information technology. Specifically, the agencies must ensure accessible technological offerings to persons with disabilities so long as the efforts do not cause an undue burden (Access Board, 2000).

**Accessibility Implementation Guidelines**

As institutions begin to consider an appropriate
approach to creating and implementing accessible technology policies and practices, they are faced with choosing among existing guidelines or creating their own. During 2006, in the world of technological accessibility, institutions would have found two nationally accepted sets accessibility guidelines. In addition, some states such as Illinois developed their own set of guidelines. While all of the guidelines were similar in so much as they all promoted accessible website design, they all differed in their level of stringency.

To begin, the least stringent set of guidelines available in 2006 were the Federal Government's Section 508. This low level of stringency is due to the limited amount of accessibility checkpoints. Building upon Section 508 of the Rehabilitation Act Amendments of 1998, the second set of guidelines were known as the Illinois Web Accessibility Standards (IWAS). The third, and most stringent set of guidelines when fully implemented, were the World Wide Web Consortium’s (W3C) Web Content Accessibility Guidelines 1.0 (WCAG 1.0). While the intention of each set of guidelines was to create a more universal electronic environment, some are more effective for both users and website developers than others. The following is a more in-depth review of each of the
available guidelines.

**Federal Section 508 Guidelines**

As institutions worked toward being more fully accessible in 2006, many found Section 508 web accessibility guidelines to be sufficient. Supported and developed by the Access Board, an independent federal agency created by the Rehabilitation Act of 1973 (Access Board, 2007a), Section 508 remained unchanged in 2009 and addresses web-based intranet and Internet information and applications (Access Board, 2007b). With a total of sixteen points, the guidelines include such things as describing pictures for those who are visually impaired, ensuring that multimedia presentations such as videos are captioned, and the prohibition of screen flicker so as not to induce seizures. The practical intent of Section 508 is to provide guidance on how to minimally address accessibility issues so that a broad range of individuals with disabilities have a better opportunity to access the information found on the web.

The benefit of Section 508 guidelines is that they were developed in a succinct and achievable manner. Shortly after their development, tools became readily available to automate the accessibility implementation process. This was quite important because by doing so, the tools relieved
some of the stress of understanding the intent of the guidelines and how they should be appropriately applied to electronic resources. For example, a free tool known as A-prompt (A-Prompt, 2007) can evaluate a webpage for accessibility. Then, interactively, provide the developer with the opportunity to implement accessible features.

Another example of Section 508 technological implementation support is HiSoftware’s Cynthia says portal (2008), which crawls through all of a website's code and then provides a detailed report on the accessibility flaws found within a webpage. When provided with the appropriate tools, even novice developers have the opportunity to incorporate Section 508 accessibility into their webpages. Consequently, the availability of such tools offered, and continues to offer, a process which helps postsecondary institutions facilitate the implementation of accessible website design.

**Illinois Web Accessibility Standards**

As was common with many states (Information Technology Technical Assistance and Training Center, 2006) during the time period of this study, Illinois Governor George Ryan signed an Administrative Order directing Illinois agencies to “utilize the Illinois Web Accessibility Standards (IWAS) for the development of websites, intranets, and web-based
applications” (Illinois Technology Office, 2002a, ¶ 2). Based on the federal Section 508 guidelines and the W3C’s WCAG 1.0, the Illinois Technology Office utilized an open forum to create a standard that it feels is “more suited to serve the users of Illinois web sites” (Illinois Technology Office, 2002b, ¶ 2). What they created was a set of implementation guidelines, which include 21 points.

Starting with the basics and requiring standardized web programming code so as to ensure bad coding does not affect equal access, IWAS thoroughly addressed common accessibility coding barriers and how they could be overcome. Examples of such barriers include using images to display text because the image drastically degrades when enlarged and thusly, renders the text useless to a person with low vision, or conveying information with sound alone, which a person who is deaf would be unaware of and, consequently, could not access.

The benefit of IWAS was that they were more specifically focused on the functional needs of persons with disabilities as evident by the 21st point, which states that a website should be tested with various assistive technologies in order to ensure that an individual using those technologies can access the webpage. Unfortunately, I found that while working as a statewide accessible website
design expert during 2006, no tools were developed to
directly assist with the implementation of these more
complex guidelines. Furthermore, I found that this created
a separation between a small group of elite programmers
capable of understanding and implementing accommodations
into their code and another group incapable of acting
without further training.

Even for those willing to learn, this set of guidelines
was somewhat time consuming due to the need for the
programmer to manually input accessible alterations
directly into the web code rather than having a program
interactively alter the web code. For instance, a web based
code could be thousands of lines long and a programmer
would need to know where and when to alter the code. This
is as opposed to a program that goes through the code and
then asks the creator for input on what the end result
should become.

**Web Content Accessibility Guidelines 1.0**

Considered the most stringent of all guidelines during
2006 as well as the model used to benchmark other
guidelines, the World Wide Web Consortium (W3C) created the
Web Content Accessibility Guidelines (WCAG) 1.0 to provide
a means for an inclusive web. WCAG 1.0 is a three-tier
system (World Wide Web Consortium, 1999) with a greater
accessibility standard depth than Section 508 or IWAS. The first tier is known as Priority 1 and includes checkpoints that must be met or else one or more groups of individuals with disabilities will find it impossible to access the page. Outside of the electronic world, this is similar to informing a person who utilizes a wheelchair that the book they need is on the top shelf located 15 feet high and can only be accessed with an old library ladder.

If the checkpoints on the second tier, Priority 2, are not met, it might be difficult for one or more groups to access the page. For example, checkpoint 13.1 suggests that links need to have contextual meaning when read by themselves as opposed to, say, a link that reads “click here,” which gives no indication where the action will lead. This is similar to informing a person who is blind that the bathroom door is blue. Yes, they might find the bathroom, but there is a good chance that they will have to try a few doors before arriving at their appropriate destination.

If the third tier is not met, Priority 3, one or more groups might find the page somewhat difficult to access. An example of this is checkpoint 13.10 that calls for a way to skip American Standard Code for Information Interchange (ASCII) art when that art takes up multiple lines.
ASCII art is a method of creating images through the use of common keyboard characters such as :) or :>. When a developer has created a large ASCII image, such as a cat that takes up 100 lines, the situation becomes problematic to users of screen reading technologies. This is so because the person using the screen reader will have to listen to a large amount of asterisks (*) and dashes (-) prior to accessing more contextual information located below the image. With a total of 65 specific checkpoints, those completely implementing WCAG 1.0 will find their web resources more accessible to all users.

Examples of how these specific checkpoints contribute to accessibility include such things as ensuring that when things convey information with color that they can also do so without color or using relative sizes rather than static ones so when a screen is enlarged. Also, ensuring the size of elements (text, pictures, tables, etc.) on a page become larger in direct relation to other elements on a page, or even ensuring that language changes are indicated so when a screen reading program comes across something different than English, it can adjust and read the information in the foreign language.

The benefits of utilizing WCAG 1.0 are many, from tools in place ready to automate implementation to accessible web
offerings. As previously expanded upon, WCAG's 1.0 three tiers start with the first tier checkpoints that must be addressed or else groups will not be able to access information on a webpage and finish on the third tier with checkpoints that, if neglected, will make it somewhat difficult for some individuals to access certain information on a webpage.

When web developers report on their compliance to W3C's WCAG 1.0, the do so with a compliance level rather than a priority level. Level A indicates that all Priority 1 guidelines have been met. Level AA indicates that Priority 1 and Priority 2 have been met, and Level AAA indicates that all three Priority levels have been met.

Implementing all guidelines of W3C's WCAG 1.0, Level AAA, might be more time consuming than Section 508 and IWAS, but the end result is information that easily transforms itself to meet the needs of an individual user. In doing so, all webpage visitors will have an equal opportunity to experience the content of a page.

I should also note that W3C offers a logo to place on a website to publicly display the site’s level of conformance. In addition, not all three levels are always met and some developers choose to implement Level AA or Level A that happens to be lower than any other set of
guidelines when no other levels are in place. In a sense, I have found that providing an indication that a webpage is Level A compliant somewhat creates a false sense of face validity to individuals who are unaware of the meaning of a W3C Level A logo placed on a website.

University of Illinois at Urbana-Champaign

Best Practices

Supported by the Illinois Board of Higher Education Web Accessibility Consortium, the University of Illinois at Urbana Champaign (UIUC) Campus Information Technologies and Educational Services (CITES) and Disability Resources and Educational Services (DRES) created Web Accessibility Best Practices to improve the accessibility of web resources (2007c). These practices were available in 2006 and continue to be so in 2009. While based on Section 508, IWAS, and W3C WCAG 1.0, these best practices implement a “user-centered” concept that focuses on the functionality/usability of a web resource rather than a technical aspect.

In other words, developers can create a webpage in a fashion that “technically” meets requirements of a particular guideline yet it might still be “functionally” useless. For example, a web designer can use a common frame technique where content and navigation are separated into
two frames. With the appropriate html markup, this technique can easily pass even the most stringent technical guidelines, yet when a low vision user magnifies the page, text within a frame might easily disappear, which, consequently, renders the page inaccessible to that individual. For this very reason, UIUC CITES and DRES developed best practices were developed so that when properly implemented, individuals with disabilities can equally interact with the information being presented.

In their efforts to address web accessibility, technicians at CITES found four trends of inaccessible elements in webpages. These involved HTML standards, navigation, text equivalents, and scripting. By using proper HTML standards, the creator ensures compatibility not only with assistive technologies such as screen readers but also interoperability with various browsers such as Firefox, Explorer or Safari as well as being usable by technologies such as PDAs or cell phones.

In consideration to the navigation of a specific webpage, it is of incredible importance for a person with a disability to have a textually supported page because interacting with a graphics only page can be problematic. For example, a web creator might have over 100 links on a particular page.
Visually, the developer can implement no accessibility design techniques at all and separate the 100 links into categories with colors and locations where a sighted person can easily scan the page for the link they need. However, if one is unable to see the page, but uses a program to read all the links out loud then it becomes quite cumbersome to sift through the 100 plus links. Appropriately, these links cannot only be organized visually, but also contextually for individuals unable to access the visual representation.

The text equivalent category addresses the use of images on a page as well as the inappropriate use of images on a page. While all images must have appropriate text equivalents so the meaning of the image is conveyed to an individual who cannot see the image, some images should be used with caution. For example, if the sole purpose of an image is to be a picture of text rather than text, then designers should avoid using it and instead, accomplish the effect of the picture using other techniques. Text images are problematic for individuals using screen enlargement because an image does not always gracefully transform with size and information is often lost.

The last category addressed in the 2006 best practices concerns the use of scripting. The purpose of scripting is
to have some type of affect or cause some type of affect with the webpage through user interaction such as having a sub-menu appear when the user scrolls their mouse cursor over a particular area. The problem with scripting is that anyone who is unable to use a mouse to place the cursor over the area loses out on any information conveyed in the sub-menu.

Ultimately, the UIUC Best Practices Consortium accessibility guidelines offer the most stringent available set of tools for functionally accessing websites in Illinois. They comprehensively incorporated information from all of the other guidelines and thus offer us a great resource for ensuring website accessibility.

**Website Accessibility Studies**

In 2005, Williamson described a major flaw in academia today, arguing that:

Most postsecondary institutions state that one of their goals is to prepare an educated citizenry to become productive, participatory members of today's workforce and society. Yet postsecondary institutions restrict the ability of individuals with disabilities to participate in educational opportunities due to website accessibility issues. (p. v)

With this discrepancy in mind, a few researchers have
studied this problem by drawing upon pertinent statutes and accessible design guidelines to evaluate the accessibility of postsecondary websites (Bray & Algozzine, 2001; Chilson, 2002; Flowers, Gutierrez & Long, 2001; McCullough-Stein, 2002; & Williamson, 2005).

Overall, this group of researchers targeted expected leaders in website accessibility such as educational institutions or special education departments. While all used the automated accessibility evaluator called BOBBY, not all results were favorable.

In an effort to explore this topic, Williamson (2005) researched web accessibility for postsecondary institutional websites based on the web Accessibility Initiative of the World Wide Web Consortium and Section 508 of the Rehabilitation Act Amendments of 1998. Williamson (2005) designed the research to examine webpages from a sample of 322 public and private postsecondary institutions derived from an NCAA Division I Schools roster. Using the BOBBY accessibility evaluator set to assess in accordance with W3C WCAG 1.0 Level AAA (Priority 1, 2, and 3), Williamson (2005) reported that 35.71% (n=115) of the institutional website homepages, as well as pages one link level down in the same URL domain complied with Level A (priority 1), 1.86% (n=6) Level AA (priorities 1 and 2),
and 1.24% (n=4) complied with Level AAA (priorities 1, 2, and 3). Overall, only 14.29% (n=46) would comply with Section 508. As related to a person with a disability attempting to access these pages, they would only be able to fully interact with 40% of the institutional websites studied.

Williamson (2005) also reported that public institutions had a higher rate of compliance than private institutions. Research institutions were also found to have a higher compliance level than non-research institutions. Finally, there was an increase in compliance between the years 2002 and 2003. Williamson (2005) concluded that institutions were not doing enough and recommended that policies must be enforced in order to help bring accessibility to the web.

In 2002, McCullough-Stein examined website accessibility and accessibility policies of all 33 colleges and universities that constitute the National Council for Accreditation of Teacher Education (NCATE) Pacific Region to “evaluate the accessibility of college and university homepages and College of Education (COE) homepages for the visually impaired and for compliance with Section 508” (p. 6). McCullough-Stein (2002) argued this subject was important because “compliance with Section 508 not only
affects the accessibility issues of the disabled population, but that of the general population as well” (p. 12).

McCullough-Stein (2002) utilized the automated website accessibility checker, BOBBY, to evaluate sites utilizing the 16 point Section 508 guidelines minus five areas that BOBBY cannot automate due to human input subjectiveness. These five areas that are more subjective are proper use of markup and style sheets, clarified language, accessible embedded interfaces, clear navigation, and clear and simple documents.

McCullough-Stein (2002) found that 81% of the NCATE accredited Pacific Region (Washington, California, Oregon and Nevada) university homepages failed and that 84% of the COE homepages failed. She also found that 75% of the sample had web policies that included guidelines for compliance with Section 508. McCullough-Stein (2002) recommended further research in this area to examine improvements in both practice as well as resources for evaluating accessibility.

In a similar study, Chilson (2002) examined website accessibility for the visually impaired and web policy at all 25 NCATE-accredited colleges and universities in the Mountain Region to “evaluate the accessibility of
electronic information for the visually impaired on college/university homepages and College of Education homepages” (p. 4) with the intent to influence policies and practices. Chilson (2002) rationalized the assessment of the homepages of the university and College of Education because they are “the most common starting point for any student seeking information about the college or university” (p. 39). Furthermore, if these pages were not accessible, “most students with visual disabilities would not be able to get past” (Chilson, 2002, p. 40).

Similar to McCullough-Stein (2002), Chilson (2002) utilized BOBBY to evaluate sites utilizing the 16 point (a-p) Section 508 guidelines. Chilson (2002) found that 20% of the NCATE accredited colleges and universities in the Mountain Region (Arizona, Colorado, Idaho, Montana, New Mexico, Utah, and Wyoming) hosted homepage websites that were accessible to the visually impaired and compliant with Section 508 of the Rehabilitation Act Amendments of 1998. Chilson (2002) also found that only 12% of the College of Education homepages were accessible. For Chilson (2002), the results indicated a “lack of accessibility of college and COE [College of Education] homepages” (p. 99) and she recommended more studies to examine how institutions were applying Section 508 guidelines.
Flowers, Bray, and Algozzine (2001) furthered web accessibility research when they “examine[d] the accessibility of community college homepages and provided information on making them accessible (if necessary) to individuals with disabilities” (p. 478). The researchers' method for this descriptive study of community college websites included a sample that generated using the go.com search engine to list 720 community college websites. Of those sites, they randomly sampled 260 with seven of those being unavailable.

The researchers then utilized BOBBY 3.2, an automated accessibility checker, to evaluate the sites for accessibility based upon W3C WCAG 1.0 guidelines. Of the remaining 253 available sites evaluated, 77.1% failed the Priority 1 level of accessibility. There was an average of 1.01 accessibility errors per page. For example, most of the pages (64.2%) did not provide alternative text (alt text) for images, 17.3% did not provide image map alt text, and 5.5% did not provide alt text for each applet. “This study provides empirical evidence that most community college homepages are not accessible” (Flowers, Bray, & Algozzine, 2001, p. 481). The authors recommend that web validation methods such as online accessibility checking tools should be instituted early in the development stages.
and that individuals with disabilities be invited to provide input on how usable developed webpages are and where problems exist (Flowers, Bray, & Algozzine, 2001).

Gutierrez and Long (2001) were also interested in web accessibility in postsecondary institutions, looking specifically at management programs. More specifically, in order to determine how well prospective students with disabilities are able to access Internet-based information about business-related majors, the university homepages of the International Association for Management Education's AACSB (Association to Advance Collegiate Schools of Business) accredited programs were evaluated for disability-accessibility. (Gutierrez & Long, 2001, p. 75)

They proposed that businesses are starting to utilize previously untapped persons with disabilities workforce, and postulated that business programs/majors in colleges and universities, if anticipating the market correctly, should be actively seeking qualified students with disabilities who, especially with the technology available for accommodations, will be the successful future business professionals. (Gutierrez & Long, 2001, p. 75)
In doing so, they staged the importance of the impact that persons with disabilities will have on business.

In addition, Gutierrez and Long (2001) pointed out that there could be legal consequences for not complying with mandates and that not providing access meant that institutions were missing out on a large group of individuals. In consideration to legal implications, researchers pointed out the importance of understanding and adhering to the Rehabilitation Act of 1973 and Amendments, Americans with Disabilities Act of 1990, Telecommunications Reform Act of 1996, and the Technology-Related Assistance for Individuals with Disabilities Act of 1998.

Gutierrez and Long (2001) evaluated the university homepages (392) of the International Association for Management Education's Association to Advance Collegiate Schools of Business (AACSB) accredited programs for disability-accessibility via the use of BOBBY set to evaluate according to the World Wide Web Consortium (W3C) Web Content Accessibility Guidelines 1.0 (WCAG 1.0) Priority 1. Gutierrez and Long (2001) utilized both automated and manual checks were utilized, which is a more robust method not commonly used because of the technical expertise needed, as well as the time required for each manual check. Of the 392 pages examined, 124 “passed the
initial test for accessibility” (Gutierrez & Long, 2001, p. 77). Gutierrez and Long (2001) concluded that “making a website accessible is not a complicated process” (p. 83) and that institutions should ensure that developers are aware of the issues and needs.

In 2001, Schmetzke's personal experience with adaptive technologies and accessible website design afforded him the opportunity to observe a rift between what adaptive technologies were capable of doing and how inaccessible website design presented itself as a barrier and, consequently, excluded full website interaction for persons with disabilities using adaptive technologies. He maintained that the best technologies utilized by the most competent person become useless if websites are not designed in an accessible manner. So, Schmetzke (2001) built upon previous web published research and studied the following questions:

How accessible are the web pages of the nation's leading library schools; Is there a correlation between library schools' rank and their website accessibility; How accessible are the web pages of the major library web sites on the same campuses; Is there a correlation between the web accessibility of library sites and library school sites; and which types of accessibility
barriers occur most frequently (p. 41)? Smetzke (2001) did not randomly choose the sample, rather, he borrowed from the *US News & World Report on America's Best Graduate Schools* and took the 24 most highly ranked library schools. He then utilized BOBBY and examined library homepages and all the links found on each site that connect to another institutional page. The standard that Smetzke (2001) used to evaluate the sites was the World Wide Web Consortium (W3C) Web Content Accessibility Guidelines 1.0 (WCAG 1.0) Priority 1, the first out of the three-tiered priority system requiring compliance.

For the 24 library schools studied, 59% of the university's library websites and 23% of the library school's websites met guidelines. The 59% was higher than expected and the 23% was lower. Smetzke (2001) pointed out that this might imply that library schools are turning out a new generation of librarians who do not come from a background that integrates accessibility into practices. He also indicated that whether or not the school's library site was accessible had no relationship to whether or not the library school's website was accessible. In addition, Smetzke (2001) was also surprised that over 98% of the pages that failed contained basic inaccessible elements that would not require a major overhaul to repair the site,
such as providing alternative descriptions (alt tags) to images.

In a similar study, Flowers, Bray, and Algozzine (1999) wanted “to evaluate the accessibility of university special education programs' homepages and discuss accessibility recommendations” (p. 21). Researchers derived their special education homepage sample from a web-based search for special education programs. Of the 750 results, 89 fit the profile of being a postsecondary special education program.

Researchers then tested the sites with BOBBY 3.0, but did not directly indicate the level of accessibility (A, AA, AAA) nor did they indicate what constituted an error. However, 73% were found to contain at least one error with an average of 4.8 errors per page and of that group, 83% of all errors found “were rated as easy to correct” (Flowers, Bray, & Algozzine 1999, p. 3). Recommendations from this study included: provide designers with accessible models, have designers test for accessibility, use cascading style sheets to facilitate text only accommodations, and provide contact information should an accessibility issue arise.

**Barriers to Implementation**

While designing websites to be accessible is considered easy and doable by some, website accessibility studies present a different picture. Could it be the lack of
training and resources, poor or no administrative direction, or perhaps perceptions concerning accessibility that result in inaccessible websites? To answer this question, it is useful to review studies of the variables involved with the barriers to implementing accessible web resources. In 2005, Ferguson sought to explore, understand, and describe the thoughts and actions of college and university personnel responsible for web-based course development regarding ADA compliance, particularly as it applies to distance education, adaptive technology, and students with disabilities who depend on it to access their courses. (p. 9)

Ferguson’s (2009) intent was to add to distance education research, add to technology use research, contribute to theory formation, help on-line instructors, and to increase access to the Internet for adaptive technology users. To accomplish this goal, Ferguson (2005) began by asking the question “What are designers of web-based distance education courses doing to accommodate adaptive technology aids for students with disabilities” (p. 10)?

To answer this question, Ferguson (2005) interviewed and observed repeated performances known as role behavior of 19 people from two community colleges and two universities.
These 19 respondents represented “instructional technology personnel, ADA coordinators, and academic administrators” (Ferguson, 2005, p. 18). Ferguson (2005) drew upon Creswell’s (1998) description of a collective instrumental case study to develop her study. She described how she particularly selected the sample for her collective instrumental case study because “the focus is on what the players knew and what they did with the knowledge they had” (p. 76), “how various groups on campus interacted with each other” (p. 76), and then, she “compared what happened on one campus to what happened on other campuses for insight” (p. 77).

Ferguson (2005) collected data and drew from three theories to create her own framework in order to help her better evaluate and discuss her data. Those three were social systems, loosely coupled systems, and policy implementation. More specifically, she showed that the concept of web accessibility is unclear among distance learning professionals; institutions that have individuals responsible for ensuring accessibility are more successful with web-based initiatives; “two of the five ADA coordinators would actively discourage students with disabilities from enrolling in on-line classes” (Ferguson, 2005, p. 153); that it would be considered unreasonable to
request faculty to learn how to author accessible websites; and finally, faculty training on web accessibility is not provided by instructional technology personnel.

Ferguson (2005) concluded that institutions were working with accessibility on a case-by-case basis and that they did not have an accessibility plan or did not enforce one when it existed. Ferguson (2005) also found that individuals did not know what they were required to do in regard to the law, nor did institutions make training a priority. In the end, Ferguson (2005) argued that web accessibility is not driven by the developers of on-line courses but, rather, the efforts are “fueled by student services people who serve the students with disabilities” (p. 159) and that the “strongest advocate and biggest force for moving accessibility forward on each campus was the student disability coordinator, not a technology person” (p. 159).

In 2004, Roh expanded upon the perceptual knowledge base as it relates to students with disabilities and web-based instructional personnel in higher education. Roh (2004) did so through research based upon three purposes. First, Roh (2004) was interested in how educators, students with disabilities and staff perceive Universal Design for Learning (UDL), which is a method for creating
instructional materials accessible to all, in regards to Web Based Instruction (WBI).


In his research, Roh (2004) designed heuristic case studies involving a series of interviews with 32 people in three different constituencies “(1) 18 students with certain types of disabilities, (2) five on-line educators, and (3) nine educational support staff” (p. 90). After examining the data, Roh (2004) concluded that most involved with the study were neither knowledgeable about assistive technologies nor accessible web design. Most instructors were not prepared to make their offerings accessible although they agreed it was the right thing to do (Roh, 2004).

Lazar, Dudley-Sponaugle, and Greenidge (2004) also indicated that a large percentage of websites remain inaccessible to persons with disabilities. Considering that
a significant volume of information already exists on creating accessible sites, the researchers were interested in finding out the reasons why web masters were not implementing accessibility. To address this issue, they developed a 15 question survey, which also included five demographic questions.

While they provided no indication of how they chose web masters, nor a percentage given for a response rate, they reported that 175 web masters responded to the survey. However, one of the demographic questions inquired about web master location and responses indicated a worldwide distribution of the survey. Lazar, Dudley-Sponaugle, and Greenidge (2004) reported that results of the survey indicated that web masters supported accessibility but cited several barriers to implementation, including lack of training, managerial support, client support as well as inadequate development tools and confusing guidelines. With these results, it becomes more apparent as to why websites are not as accessible as they could be.

In exploring the gap between knowledge and implementation, Hackett, Parmanto, and Zeng (2005) commented that the Internet introduces new technologies at a rapid pace, which creates a challenge to keep websites accessible. The researchers built upon the Web
Accessibility Barriers (WAB) measurement framework developed in Zeng's (2004) dissertation, focusing on consumer health information websites. While they did not directly examine postsecondary sites, the implications of the rapid pace remains constant for all (Hackett, Parmanto, and Zeng, 2005).

Hackett, Parmanto, and Zeng (2005) argued that as the Internet introduces new methods for deploying information, it is a challenge to maintain accessibility for persons with disabilities. They wanted to examine how sites fared over time in respect to accessibility and complexity. To accomplish this goal, researchers obtained a list of the top 500 ranked websites, as indicated by the web information company named Alexa, and the top 100 Government websites. From these, they chose 221 public and 22 government sites to study. For the public sites, an annual yearly random sample of 27 was taken. Access to old sites (1997-2002) was obtained through a service from the Internet Archive and Alexa called the Wayback Machine (Internet Archive, 2007), which archives websites found on the Internet in monthly increments.

Hackett, Parmanto, and Zeng (2005) used the BOBBY accessibility checker to assess for accessibility using a modified set of Web Content Accessibility Guidelines. The
modification only checked for elements that could be assessed automatically. Results from the evaluation were then fed into a developed metric that produces a Web Accessibility Barrier (WAB) score. Researchers developed a formula and assigned weights to variables such as tags, scripts, and objects (html codes). Researchers then used these weights as input to produce a complexity score. The higher the score, the more complex a website would be considered.

For the public sites, mean WAB scores increased each year (less accessible) and a significant difference ($F[5, 156] = 4.943, p<.001$) resulted, while the WAB scores for government sites remained constant. Complexity scores also increased over the years and were also significantly different over the years for both the public ($F[5, 156] = 13.587, p<.001$) and government ($F[5, 105] = 3.758, p<0.01$). When evaluating the relationship between WAB scores and complexity scores, researchers found that a significant correlation (outliers removed) was found between the two for both public ($r=0.497, p=<0.01$) and government ($r=0.14, p<none provided$). Ultimately, Hackett, Parmanto, and Zeng (2005) concluded that as developers implement new complex components into webpages over time, they introduce additional barriers to accessibility for
persons with disabilities.

In a similar study that examined the accessibility of websites over time, Stowers (2002) assessed 148 federal websites for compliance to Section 508 approximately one year after they were required to be accessible. Using the BOBBY analysis, the researcher found that only 13.5% of the sites evaluated passed with no errors. The researcher commented that this was surprising considering that “all federal sites were supposed to have complied with Section 508 of the Rehabilitation Act of 1973 by June 25, 2001” (Stowers, 2002, p. 19). It was unknown whether or not the sites had regressed from original accessibility or website designers were slow to implement Section 508.

**Legal Compliance**

It is not always a simple task to understand and appropriately apply disability statutes for local judicial applications. To assist with this matter, enforcement agencies are assigned with the task of interpreting and implementing the intent of statutes in regard to individual applications. Assigned to the disability representation task and responsible for ensuring educational institution compliance with Section 504 of the 1973 Rehabilitation Act as well as Title II of the Americans with Disabilities Act,
the United States Department of Education’s Office for Civil Rights (OCR) investigates complaints, provides findings, and recommends appropriate resolutions. These recommendations produce interpretations of relevant statutes which significantly influence how the court system handles disability cases.

As Grossman and Vasquez discussed (2004), OCR has issued several opinions applying the requirements of the Section 504 of the Rehabilitation Act and Americans with Disabilities Act regulations to situations involving access to distance education and/or computer-based instruction. In doing so, OCR has not only defined the rules of the technological road, but has also, to some extent, become the police on the information highway.

The Office of Civil Rights is not the only authoritative body in relation to the Americans with Disabilities Act. The U. S. Department of Justice (DOJ) can also enforce the Americans with Disabilities Act, which creates an overlap in coverage. Yet, for the most part, the DOJ refers educational issues to OCR and stands by its findings.

**Notable Higher Education Cases**

As institutions expand the horizons of the information highway by placing more and more information on the web,
the need for electronic curb cuts to ensure greater accessibility becomes more pressing. As I already described, statutes and guidelines are in place to ensure an equal technological experience for students with disabilities. Yet, institutions have been slow to comply. In response, individuals have brought several legal complaints against these institutions. These cases provide useful information about the challenges of implementing appropriate technological accommodations. They also include important statements about legal precedents regarding accessibility.

**San Jose State University - Access to the Internet**

As institutions move academia into the new century, Internet usage has fast become an integral piece of the student experience. In 1996, a student with a visual disability claimed that San Jose State University did not provide equal access to the Internet. However, the institution did permit the student to utilize a personal reader for intranet access through limited appointments. The student also alleged that the institution failed to complete a “self-evaluation plan” as required by Title II of the Americans with Disabilities Act. The University entered into a voluntary resolution plan, which addressed the availability of an accessible computer and the

Three important topics emerged in this case that OCR shed some light upon. First, access provided to the Internet was an issue because the extent of communication to on-line resources for students with disabilities was not as effective as what other students could obtain. Second, the OCR maintained that computers are auxiliary aids needed for effective communication for persons with disabilities. Third, OCR indicated that the information superhighway is a fundamental tool in postsecondary research (U. S. Department of Education, Office for Civil Rights, 1996). By defining these three issues, other institutions can expect that their respective OCR offices will follow suit and should take note of the ways that their institutions are handling these three points prior to OCR stepping in.

California State University, Los Angeles (LA) - Campus

Computing Access

When considering technological accessibility, many misconstrue the concept by applying it only to the Internet when, in actuality, there is a larger picture. In 1997, a student with a visual disability claimed that California State University, Los Angeles discriminated against blind and low vision students. The student alleged that students
with visual disabilities did not have equal access to library resources, campus publications, open computer laboratories, training on technology, and computer test taking. After some work with the OCR, the University entered into a commitment to resolve the issue by providing access to the library, network, and labs in conjunction with providing training on assistive technology software and hardware (U. S. Department of Education, Office for Civil Rights, 1997).

OCR found that the Title II of the Americans with Disabilities Act term “communication” applies to the transfer of information. This transfer is to include lectures, textbooks, and resources on the Internet. OCR also identified “effective communication” as being timely, accurate, and in a medium appropriate for the individual with a disability. When considering appropriate auxiliary aids utilized to transfer information, OCR stated that primary consideration should be given to the individual with a disability (U. S. Department of Education, Office for Civil Rights, 1997). These findings illustrate how important it is to present information in an accessible fashion and resources available to access that information that are appropriate for individuals with disabilities.
In another case involving the physical environment of technology provided, a student with a visual disability claimed that California State University, Long Beach did not provide equal access to the College of Business curriculum and other educational programs. The student further alleged that the College of Business computer labs, classes, and required textbooks were not adapted into an accessible format. The University entered into a voluntary resolution plan, which included a plan for accessible workstation responsibility, accessible technological purchases, and an institutional plan to implement web design practices that maximize accessibility to users with disabilities (U. S. Department of Education, Office for Civil Rights, 1999).

Notably, the OCR indicated that communication should be “as effective as” that provided to non-disabled peers. OCR also indicated that while institutions might rely on centralized accommodation locations, doing so excludes the student from an integrated experience in the mainstream education. Consequently, institutions should take note that the most effective location would be in the same location as the non-disabled peers (U. S. Department of Education,
California Community Colleges – OCR Compliance Review

In the late 1990s, the OCR conducted a statewide compliance review of California Community Colleges to ascertain if students with visual impairments were accorded an equal educational opportunity. After their review, the OCR addressed nine accessibility issues in a letter to Chancellor Nussbaum (U. S. Department of Education, Office for Civil Rights, 1992). Specifically, the nine were:

1. Include adaptive technology in technology budgets and purchases.
2. Keep staff trained on utilization of technology.
3. Develop web accessibility guidelines.
4. Provide system wide adaptive technology grants.
5. Create a state center for adapting textbooks into electronic format.
6. Create a central registry for adapting textbooks.
7. Integrate library systems with adaptive technologies.
8. Create a follow up survey to OCR’s work.
9. Include adaptive technology in campus accessibility reviews (U. S. Department of
After receiving this list, the California Community Colleges committed to resolving these areas of concern.

The creation of this list was monumental for persons with disabilities because the California OCR holistically addressed adaptive technology instead of focusing on a single issue. Rather than searching out a local resolution, the California Community College system tackled these issues by implementing guidelines such as the distance learning accessible guidelines (Chancellor’s Office California Community Colleges, 1999) and the alternative media guidelines (Chancellor’s Office California Community Colleges, 2000). These actions benefit institutions in the long run by using resources to create an accessible electronic society rather than spending them on repairs in the future.

**Summary**

As the information highway becomes integral to the academic world, faculty and administrators increasingly embrace the opportunity to integrate the myriad of technological tools and resources into their educational environment. This technological infusion has afforded students with disabilities a greater opportunity to experience a quality education in an unprecedented fashion.
Ironically, as shown throughout this review, the same information technology capable of leveling the playing field for students with disabilities has actually created significant electronic barriers. These barriers exist due to a variety of factors, including lack of awareness, limited resources and differing perceptions by those creating the electronic media. Unfortunately, accessibility problems might be the reason why Americans with disabilities are less than half as likely as their non-disabled peers to own computers and about one quarter as likely to use the Internet (Kaye, 2000). As indicated with the legislative requirements and OCR cases, it behooves institutions to provide accessible media in order to stay legally sound.

As I have shown, there are a myriad of issues related to website accessibility. From website accessibility studies, barriers to implementation, and issues of legislative compliance, there is much for institutions to consider. However, one important area that is lacking in the knowledge base is the affect that policies and mandates have on the accessibility of websites. In response to this gap, my work focuses upon policies and mandates and their affect on the accessibility of postsecondary institutional websites.
CHAPTER 3

METHODOLOGY

In 1998, Section 508 of the Rehabilitation Act Amendments (29 USC § 794d, 2009) required governmental websites to adhere to 16 website accessibility guidelines (Access Board, 2007c). Then in 2002, an Administrative Order signed by Governor Ryan built upon Section 508 guidelines and required Illinois governmental institutions to adhere to a more stringent set of guidelines (Illinois Technology Office, 2002a), and as written in 2004, and required in 2006, the Illinois Board of Higher Education (IBHE) (2004a) requested website accessibility reporting and continuous improvement in regard to website accessibility for institutional homepages. Of the three, the only one in the group that had enforcement means during 2006 was IBHE's reporting requirements. The other two, while influential, did not put in place a mechanism to ensure adherence.

Of particular importance, IBHE supported their continuous improvement requirement through the Higher Education Cooperation Act Short Term Experimental Education Grant titled Adaptive Computer Technology and Accessible Website Design in fiscal year 2005 as approved in 2004 (Illinois Board of Higher Education, 2004b) and then again
in 2006 as approved in 2005 (Illinois Board of Higher Education, 2005). This statewide collaborative effort afforded me the opportunity to assist with the implementation of continuous improvement through accessible design workshops provided at multiple Illinois institutions. During this time, many institutional representatives took advantage of these opportunities.

With regard to website accessibility, the intent of this study is to draw upon IBHE's 2006 reporting requirements, established in 2004, and examine Illinois postsecondary institutional homepages and their respective accessibility for individuals with disabilities. I use a mixed method approach in an effort to identify changes in accessibility practices.

Quantitatively, I accessed webpages during this time period through the Internet Archive's Wayback Machine (Internet Archive, 2007). This service affords researchers the opportunity to view a webpage as it appeared when archived. As a starting point, I draw from the Underrepresented Groups (URG) report's 2006 website accessibility reporting requirements and create a baseline for accessibility of institutional websites in January 2006 and then again one year later so as to measure overall change. I also use archived institutional webpages and
track them on a bi-monthly basis for one year for any anomalous spikes or trends which I then compare to collected qualitative data. I also analyzed data for changes in accessibility over the period of the study.

Qualitatively, I drew upon document analysis and autoethnographic practices to understand and represent events during this time frame. Furthermore, I gathered data about accessibility trainings from January 2006 to January 2007 and examined it for trends and influences as related to the accessibility of institutional websites. Specifically, I examined publicly available IBHE and DAC minutes and reports for instances when website accessibility issues were reported upon and/or discussed. In addition, IBHE supported website accessibility trainings provided throughout the state were examined for content, location, and all other pertinent information as related to website accessibility. By examining this accessibility issue both quantitatively and qualitatively, I intend to better represent the state of accessibility for institutional homepages during 2006.

My ultimate goal for implementing this methodology is to ascertain the extent to which institutions complied with IBHE's 2006 accessibility reporting requirements. This information will provide policymakers, administrators, and
web designers with some perspective on whether or not policy has an affect on accessible website design practices.

**Population Selection**

I selected all of the 12 Illinois public universities (Appendix A) that are listed as public institutions on the Illinois Board of Higher Education (IBHE) website (2006a). IBHE required each of these institutions was required to follow the 2006 URG reporting requirements and appropriately represent the population I am researching.

**Accessibility Guideline**

During the time frame of my research, the four dominant guidelines for evaluating accessibility were: Section 508, Illinois Web Accessibility Guidelines (IWAS), Web Content Accessibility Guidelines 1.0 (WCAG 1.0) and University of Illinois at Urbana/Champaign (UIUC) Campus Illinois Center for Information Technology Accessibility (ICITA) and Disability Resources and Educational Services (DRES) Web Accessibility Best Practices. Best practices are a combination of all, but with a user centered, functional approach to implementing guidelines as defined by UIUC ICITA and DRES (2007a). For the purpose of assessing accessibility of University websites, the UIUC SITES/DRES Best Practices (2007b) requirements were utilized.
Data Collection

I collected data in two phases. In the first phase, I utilized the Internet Archive's Wayback Machine, which has archived billions of webpages from 1996 to the present (Internet Archive, 2007) to harvest archived website data. More specifically, I collected the homepage website for each of the 12 institutions every other month (a total of 84 pages) starting in January 2006 and finishing in January 2007. In doing so, the data collected was drawn directly from the time frame of the 2006 IBHE reporting requirements. If a homepage website was not archived prior to the 16th day of the data extraction month, I went back in time until one was available. Appropriately, the page available prior to the beginning of the month would have still been present at the beginning of any given month under such circumstances. The reason I looked bi-monthly was to see if there was a relationship between website accessibility change and state level events and/or trainings. For example, was there a spike in accessibility after a specific training? Or, were there state accessibility leaders who ensured their institution’s homepages were accessible?

In the second phase, I collected available data from IBHE reports, 2006 URG accessibility reports, DAC agendas
and notes, as well as IBHE sponsored accessibility trainings. In addition, I reflect upon my own experiences during this time in an autoethnographic manner. I use this data in an effort to interpret changes in institutional website accessibility over the year.

**Accessibility Evaluation**

After the homepages were collected, the next step was to evaluate the degree to which they complied with UIUC CITES/DRES Best Practices through the utilization of the Functional Accessibility Evaluator (FAE) as installed on the Mozilla FireFox Web browser (Illinois Center for Information Technology Accessibility, 2008). One page at a time, this service assesses compliance in accordance with five main categories of HTML accessibility, which are: navigation and orientation, text equivalents, scripting, styling and HTML standards. After checking a total of 5 sub categories that cover 42 accessibility checks which range from keyboard only interaction to the presence of seizure inducing images, FAE provides a detailed report of accessibility instances.

To further expand, the results from FAE provide an accessibility pass, fail, warning, and not applicable (N/A) rating for each of the accessibility checks. While pass and fail are quite straight forward, a warning indicates that
there exists an accessibility instance that is not directly supported by an accessibility standard, but is an area that could be improved upon and a N/A is an indication that an accessibility issue was checked against an evaluated web page, but the issue being checked did not exist on the page (University of Illinois at Urbana/Champaign Campus Illinois Center for Information Technology Accessibility (ICITA) and Disability Resources and Educational Services (DRES), 2007a). For example, one check examines a page for proper use of form labels. If the page does not have any forms, then the checkpoint would be reported as N/A. Because N/A does not create a barrier to page content, N/A scores are counted as a pass score because the inaccessible element, as searched for by a particular checkpoint, does not exist.

In regards to the need for human input, computer programs are only capable of looking at a line of code and ensuring that the particular line complies with a given standard. To put it another way, FAE can test if an image has some form of accessible markup running in the background, but only a human can assess if the markup was appropriate for the particular instance. In other words, one might visually see an image of a double helix with incredible detail and description through color, but if the code running in the background merely states “double helix”
as picked up by adaptive technologies, then a person who is blind would not have an equivalent experience as a visual user. Taken a step further, the blind student would struggle with describing the double helix on a test for lack of proper information provided.

To overcome this scenario and others like it, it is necessary to have a human check for the appropriateness of the code as well as test a particular site with adaptive technologies to ensure the intent of the site's content can be equivalently shared through multiple mediums. While the initial automated evaluation provides a guideline on where to look, it is necessary to possibly go through thousands of lines of code to ascertain the true level of accessibility. Because the warnings require a subjective interpretation as completed by the author of the deployed media, I only analyzed pass and fail results. Doing so simplified the presentation of results and helped to maintain a consistent focus on possible change by providing a clear and clean cut representation of the accessibility of a particular page over time.

To further expand upon FAE results, in relation to the navigation and orientation category, FAE examines elements such as unique titles for each web page so that each page is identified individually, headers in place to identify
major and sub topics, labels to associate controls and their text descriptor, and table headers for the purpose of identifying data found within the cells of tables.

The text equivalents category aims to ensure that graphical elements are also described through the use of an alternative means. Non-text elements include such things as pictures, image maps, animated GIFs, graphical buttons, sounds, audio tracks, and videos. Each of these require a manner of conveying their meaning in a contextual format.

The scripting component of the FAE evaluation focuses on an element that has been put in place to provide an advanced form of interaction that might be impossible for a person utilizing adaptive technologies. Here, if scripting is written in an exclusionary manner, then an alternative access method must also be provided. For example, an individual who is blind does not necessarily use a mouse and if a script requires a mouse to roll over a particular element to open a menu then, for the most part, it would be impossible for a non-mouse user to access that menu.

The styling portion of the CITES/DRES practices focuses on providing the end user with the control to load a page to their preferences as well as having the original page be presented in a universal format. For example, a page should be presented with contrasting colors so a person with color
blind difficulties does not miss pertinent information on the page such as an instruction to click the yellow link. The last element that the FAE examines is the utilization of appropriate HTML standards. In doing so, FAE helps identify if the page supports interoperability with technologies and if the page still works with both old and new browsers.

The final FAE report provides the percentage of instances that pass, fail, are warned, and N/A. By taking the sum of all instances that passed plus the N/A and dividing them by the total amount of checkpoints, the end result multiplied by 100 is the passing percentage for a given homepage. This number is a direct indication of how well a page fares in regard to accessibility for individuals with disabilities. The failure rate is calculated in a similar mathematical fashion. By taking the sum of all instances that failed and dividing it by the total amount of checkpoints, the end result when multiplied by 100 is the failing percentage for a given homepage. Because warnings are not directly related to an accessibility standard as indicated by UIUC ICITA and DRES (2007a), and for the need of the developers interpretational input as to the intent of the element that caused a warning, they will not be used in the calculation
of the overall accessibility rating of a particular webpage. An example of a warning would be the use of an empty descriptor for an image such as a spacer. This technique is used for images that have no contextual meaning but visually help the layout of the page. Some pages might have hundreds of spacers that would cause the page to be textually jumbled if every time a screen reader read aloud an alternative description of a spacer such as “this image is only here as a visual spacer”.

**Data Analysis**

After completing quantitative and qualitative data collection, I used descriptive statistics and statistical analysis to address the first research question and qualitative methods to address the second:

1. To what extent did Illinois postsecondary institutional homepages meet accessibility guidelines at the start and end of the IBHE 2006 accessibility reporting requirements?

2. What factors might have influenced changes in website accessibility over time?

More specifically, I start with descriptive statistics to address the first research question by presenting the percentage ratings for navigation and orientation rates, text equivalent rates, scripting rates, styling rates, HTML
standards rates and an overall accessibility passing rate for each of the 12 institutions for January 2006 and then again for January 2007. I continue by examining a possible relationship among the January 2006 pre-rates pass (prpre) and fail (frpre) and the January 2007 post-rates pass (prpost) and fail (frpost) through the utilization of a paired t-test. This was completed for the overall accessibility pass and fail rate for each of the 12 institutions as aggregated from the navigation and orientation rates, text equivalent rates, scripting rates, styling rates, and HTML standards rates. To put another way, \( Ho: \text{prpre} - \text{prpost} = 0 \) and \( Ho: \text{frpre} - \text{frpost} = 0 \)?

To answer the second question, what factors might have influenced changes in website accessibility over time, I examined and compare data from two areas. The first was the bi-monthly quantitative degree of accessibility scores for the 12 institutional homepages and the second was the qualitative data gathered in relation to events that had occurred during the same time period. More specifically, the bi-monthly quantitative data consists of navigation and orientation scores, text equivalent scores, scripting scores, styling scores, HTML standards scores and an overall accessibility passing score for each of the 12 institutions. My focus with this data is to identify any
spike or trend in the scores from one data period to the next in preparation for comparison to qualitative data.

In consideration to the qualitative data, I researched and examined events occurring during this time period such as accessible web design trainings offered through DAC HECA grants as well as reported accessible web design practices as found in the required Under Represented Group report, as discussed in previous chapters. I used these events to help interpret significant differences in website accessibility scores. I also draw from my own experience working with Illinois institutions on website accessibility issues in an autoethnographic manner for this analysis.

**Data Reporting**

I begin reporting of the data by addressing the first research question: to what extent did Illinois postsecondary institutional homepages meet accessibility guidelines at the start and end of the IBHE 2006 accessibility reporting requirements. I present a summary of the accessibility findings and ratings for: navigation and orientation, text equivalents, scripting, styling, HTML standards, and overall accessibility passing score for each of the 12 institutions. The raw data for the institutional summaries are also presented for one institution serving as a model for all in Appendix B. In addition, paired t-test
results for the statewide institutional homepage evaluation are presented.

As for reporting on the data analysis used to answer the second research question, what factors might have influenced changes in website accessibility over time, I present aggregate and individual site data in order to show a longitudinal chart for a visual indication of possible change. Institutional practices, accessibility reports and influences are then discussed. In addition, apparent trends and spikes are then presented and discussed as related to qualitative data found in the document analysis and autoethnographic process.

Validity

As with all research, threats to both internal and external validity do exist. In regards to this research, consideration must be given to a few internal validity areas such as history, maturation, selection, experimental mortality, testing, instrumentation, and design contamination. In addition, external validity issues such as unique program features, effects of selection, effects of setting, effects of history, effects of testing and reactive effects of experimental arrangements are also examined.

Historically, Section 508 and Illinois Governor Ryan's
Administrative order were in existence as of August 7, 1998 and February 14, 2002, respectively, but the only means to enforce these was through individual complaints filed with the Office of Civil Rights.

In 2005, the Illinois Board of Higher Education's (IBHE) Disability Advisory Committee, of which I sat upon, recommended to the Board to implement a means to incorporate and maintain an accessible website standard. Aside from trainings offered around the state in relation to IBHE Higher Education Cooperation Act (HECA) grants, there existed very little information or influence on designing accessibly among Illinois institutions.

As for other internal validity issues, including selection, experimental mortality, testing, instrumentation, and design contamination, none of these are applicable due to the fact that there exists just one group, with no institutions expected to have stopped providing an online presence, the impossibility of having baseline scores affecting post-test scores, the method of measurement is the same across all measurements, and in no way could the design of the study be contaminated due to the fact that all data exists in the past.

As for external validity, which has to do with the generalizability of the study, this study is easily
generalizable to other postsecondary state institutions around the country if a particular policy to implement and enforce accessible website design can be identified.

**Limitations**

I acknowledge limitations to this study. Most prominent is the possibility of websites not being available for each month of the study. The Wayback machine does not necessarily archive on the same day every month or even every month. In consideration to this limitation, I gather data from the first day of each month and if that was not available, the next closest day, albeit before or after up until the 16th of the chosen month, was chosen. When there is no archived data prior to the 16th, I used the nearest site in the past, which would be the best representation of an institution's homepage at the beginning of the month. While I expected to have the sites be fully available throughout the time frame of the study, there was no guarantee that all sites were necessarily up and available at time of study. Appropriately, all unavailable homepage websites were reported.

A second perceived limitation would be the use of UIUC's current web accessibility best practices in relation to their best practices available in 2006. The nature of UIUC's best practices is an organic one that grows with
present time needs. Consequently, the standards are slightly different which becomes evident when comparing institutionally presented accessibility results as evaluated with 2006 practices and then again with the 2007 practices that I will be using.

Lastly, the paired t-test is an appropriate choice for the small sample size used in this study. However, if the scope of the study increased to include multiple factors then the paired t-test would not be the appropriate choice. In a similar manner, a larger sample size would be better analyzed with more sophisticated statistical methods that would implement multiple regression techniques. Doing so would be a more powerful representation of a large sample data set.

**Methodology Summary**

As I have presented in table 3-1, I intend to gather my quantitative data with Internet Archive’s Wayback Machine (2007) and evaluate each site for accessibility with UIUC’s Functional Accessibility Evaluator (2008). I will then perform descriptive statistical methods and paired t-tests in an effort to identify spikes or trends in the data. As spikes and trends are identified, I will draw upon autoethnographic procedures and document analysis to better understand the quantitative data.
<table>
<thead>
<tr>
<th>Method</th>
<th>Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Gathering</td>
<td>• Internet Archives Wayback Machine (2007)</td>
</tr>
<tr>
<td>Accessibility Assessment</td>
<td>• UIUC’s Functional Accessibility Evaluator</td>
</tr>
<tr>
<td>Quantitative Analysis</td>
<td>• Descriptive Statistics</td>
</tr>
<tr>
<td></td>
<td>• Paired t-Test</td>
</tr>
<tr>
<td>Qualitative Analysis</td>
<td>• Autoethnography</td>
</tr>
<tr>
<td></td>
<td>• Document analysis</td>
</tr>
</tbody>
</table>

*Figure 3-1 Methodology Summary*
CHAPTER 4

RESULTS

This study was designed to ascertain whether or not Illinois Universities had changed the level of accessibility of their homepages from January 2006 to January 2007 and if any spikes in the accessibility of homepages could be attributed to a particular influence such as website accessibility trainings. Specifically, the Illinois Board of Higher Education (IBHE) requested that institutions compose and put forth a continuous improvement web accessibility plan and then follow up on their implementation in the annual 2007 Underrepresented Groups Report (Illinois Board of Higher Education, 2008a). During this time of heightened website accessibility responsibility, not only was an accessibility development paper trail left behind, but a website archival service also retained institutional sites. It is from these two sources that I gathered and assessed data as presented in this chapter.

I begin this chapter with a statewide results discussion about homepage accessibility change between January 2006 and January 2007 and the accessible web design influences occurring during that time. I then address each individual institution with particular focus on
accessibility spikes in change throughout the year, as researched through bi-monthly accessibility evaluations and any other qualitative influences uncovered throughout this research.

As noted in chapter 3, I used the Internet Archives Wayback Machine (2007) to historically access institutional homepages. I harvested a total of 84 Illinois University homepages from January 2006 until January 2007. These 84 pages represented all of the 12 Illinois public universities which I assessed for accessibility according to UIUC's best practices (University of Illinois at Urbana/Champaign Campus Information Technologies and Educational Services [CITES] and Disability Resources and Educational Services [DRES], 2007b). So as to thoroughly examine each homepage, I also incorporated the University of Illinois Urbana/Champaign's Functional Accessibility Evaluator (2008) into my evaluation process. While summarized data are presented in this chapter, a more in depth representation of the 42 accessibility checks for one of the 12 institutions and their respective seven data extraction points over the period of the study that totaled 3,528 accessibility checks is available in Appendix B.

As discussed in chapter 3, results from the Functional Accessibility Evaluator are returned in the form of pass,
fail, warn, and N/A which are categorized as pass. In an attempt to simplify the presentation of results and maintain a clear focus on any possible change and respective influences, only pass and fail results are presented due to warn results being an indication that there exists an accessibility instance that is not directly supported by an accessibility standard but is an area that could be improved upon (University of Illinois at Urbana/Champaign Campus Illinois Center for Information Technology Accessibility [ICITA] and Disability Resources and Educational Services [DRES], 2007a). In addition, the decision for intent of the content and the need for improvement would require input from the developer. Consequently, by not categorizing warnings as a pass or fail, the pass / fail percentages do not always total 100%.

**HTML Accessibility Concepts**

During my presentation of institutional homepages, I commonly use coding and style terms that need to be briefly addressed in order to ensure a common understanding of the terms in context. HTML stands for hypertext markup language and is easily understood as a set of instructions for how a browser should render a webpage. One can assume that every piece of information on a webpage is a separate element such as an image or a paragraph of text. As the browser
processes the instructions, it is told where to find the element and what to do with it. For example, if I wanted an image of a Google logo on my website, in my HTML I would tell the browser to go to google.com, get the logo, and place it on my page. Some elements come prepackaged in the HTML such as text and others are external such as images. Overall, the concept of HTML is a set of instructions for how a webpage should be rendered. It is the techniques found within the HTML code that can render a page accessible or inaccessible.

One major concept of an HTML document is the separation of style and content through the use of cascading style sheets. For example, if I wanted a page to render a certain passage in blue text, I could write it directly in the code or I could refer to the cascading style sheet on what color the passage should be. The advantage of doing so is that a person that is blue color-blind can easily turn off my style sheet and load their own with no blues. The accessibility concept of a cascading style sheet is that it provides the user with a more robust choice on how a page should look when it is rendered.

JavaScript is a coding language that expands on the ability of HTML. From my experience, one of the most common uses of JavaScript is the incorporation of the onMouseOver
event for the purpose of a visual and functional effect. Typically, the effects are submenus that appear as a user places the cursor over a particular area. While the effect might be quite novel, those who do not use a mouse can not access this information which, consequently, causes an accessibility issue. Through my experience, I have found that most implementations of JavaScript are done in an inaccessible fashion. While it can be done accessibly, it takes a coding savvy person to do so.

**Statewide Results**

In 2004, the Illinois Board of Higher Education (IBHE) established the Disabilities Advisory Committee (DAC). One of their tasks was to examine web accessibility issues for students with disabilities (Illinois Board of Higher Education, 2004a). After collaborating on the issue, DAC's recommendation that each institution report on their state of accessibility and develop a continuous improvement plan between Fall 2005 and Spring 2006 was adopted and put into motion by IBHE (2006b) in October 2004.

On the implementation side of what was occurring on the accessibility front during that time, I was working closely with NIU’s Elizabeth Leake and UIUC’s Jon Gunderson on the promotion and support of accessible website design. We had already covered the state with accessibility trainings in
the previous years and were further expanding so as to include community colleges. Up to January 2006, Jon, Elizabeth, and I had reached out to all 12 state universities and offered assistance as well as providing our entire accessible web design resources online. While we continued to promote and provide support throughout the year, we were also waiting for the self reports to be publicly provided so we could respond to individually identified needs and requests. Interestingly, I was unaware of any requests for assistance outside of my own institution, SIUC. The following is a review of what I learned during my statewide research, beginning with quantitative data then following up with the qualitative.

In accordance with IBHE's reporting requirements (2006b), all institutions submitted their current state of accessibility and their continuous improvement plans by May 1, 2006 (Illinois Board of Higher Education, 2006c). Upon examining the reports, I discovered that an array of methods for evaluating the accessibility of homepages against one of three standards was used. Thematically, the standards used were either Section 508, IWAS, some level of W3C WCAG 1.0 (A, AA, AAA) or a combination thereof. Assessments in accordance with these standards ranged from accomplishing the evaluation manually, with an automated
tool, or with a set of tools.

Overall, initial homepage accessibility reports as submitted by each individual institution ranged from full compliance to low compliance. More specifically, some institutions claimed that they were 100% accessible to an easily obtainable standard while others stated that improvement was needed as they assessed to a more stringent standard. With multiple standards, such variation in reporting would be typical considering some standards are less stringent than others. Because of this variation, it is difficult to compare one site to another. In order to standardize this variation, I evaluated with one standard and one tool. In doing so, I was able to obtain consistent results that could be statistically analyzed.

In total, I analyzed 84 archived homepages for accessibility. I started with each of the 12 homepages in January 2006 and continued with samples from every other month until January 2007. To address my first research question, which asked to what extent Illinois postsecondary institutional homepages met accessibility guidelines at the start and end of the IBHE 2006 accessibility reporting requirements, I exclude the bi-monthly data and analyze only the pre and post homepages.
For this comparison, I incorporated an alpha level of 0.05 for analyses. In order to determine if there was a significant change in the accessibility of the January 2006 and January 2007 homepages, I performed a paired t-test on the statewide pre and post accessibility pass and fail rate. The mean pass rate change in homepage accessibility (M = 8.73, SD = 12.32, N = 12) was significantly greater than zero, t(11) = 2.45, two tail p = 0.03, providing evidence that there was some form of an influence on the accessibility pass rate of homepages as will be discussed in subsequent sections. I also found a 95% confidence interval about mean pass rate accessibility change of [0.90, 16.56] as provided in Figure 4-1.

<table>
<thead>
<tr>
<th>t-Test Paired Two Sample for Means</th>
<th>t-Test descriptive statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean</strong></td>
<td>8.73</td>
</tr>
<tr>
<td><strong>Variance</strong></td>
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<td><strong>Observations</strong></td>
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<tr>
<td><strong>t Critical one-tail</strong></td>
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</tr>
<tr>
<td><strong>P(T&lt;=t) two-tail</strong></td>
<td>0.03</td>
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<tr>
<td><strong>t Critical two-tail</strong></td>
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<tr>
<td><strong>Standard Error</strong></td>
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<td><strong>Sum</strong></td>
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<tr>
<td><strong>Confidence Level(95.0%)</strong></td>
<td>7.83</td>
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</table>

Figure 4-1 Statewide Pass Rate: January 2006 – January 2007

When I performed a paired t-test on the statewide pre and post accessibility fail rate (Figure 4-2), I did not
find statistical significance. More specifically, the mean fail rate change in homepage accessibility (M = -5.16, SD = 8.72, N = 12) was not significantly greater than zero, t(11) = 2.05, two tail p = .03, failing to provide evidence that there was a strong enough influence such as accessibility trainings on the accessibility fail rate of homepages. In addition, a 95% confidence interval about mean fail rate accessibility change was [.038, -10.07]. While a mean change from 16.67 in January 2006 to 11.51 in January 2007 might appear significant, the lack of significance might be due to high variation and standard error relative to the mean difference.

<table>
<thead>
<tr>
<th></th>
<th>Jan-06</th>
<th>Jan-07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>16.67</td>
<td>11.51</td>
</tr>
<tr>
<td>Variance</td>
<td>39.17</td>
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<td>1.8</td>
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<tr>
<td>P(T&lt;=t) two-tail</td>
<td>0.07</td>
<td></td>
</tr>
<tr>
<td>t Critical two-tail</td>
<td>2.2</td>
<td></td>
</tr>
</tbody>
</table>

*Figure 4-2 Statewide Fail Rate: January 2006 – January 2007*

When I opened up my examination to include bi-monthly data, there was a consistent improvement trend throughout the year for both the pass and fail accessibility rates as
evident in Figure 4-3. Furthermore, the change from one data point to the next was 2% or less. Due to this gradual change, there were, consequently, no visually identifiable statewide spikes as would be evident in a longitudinal chart. In total, Illinois public postsecondary institutions increased their pass accessibility rate from 70% up to 79% while decreasing their fail rate from 17% to 12%.

![Statewide Longitudinal Accessibility Tracking](image)

*Figure 4-3 Statewide Longitudinal Accessibility Tracking*

In attempts to ensure that statistically significant changes in accessibility did not refute the visually represented longitudinal data, I also performed paired t-Tests for each consecutive data point as well as a constant beginning point (January 2006) and ending point (January 2007). As evident with Figure 4-4, there was no statistically significant change in the pass rate between
two consecutive data gathering points. Or, in other terms, when data were examined from one bi-monthly point to the next, there was not a drastic enough change to be significant.

Pass rate t-Test exploration: Two tail p values

<table>
<thead>
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<th>Bi-monthly</th>
<th>Constant Jan 06</th>
<th>Constant Jan 07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 06 - Mar 06</td>
<td>p = 0.39</td>
<td>Jan 06 - Mar 06</td>
</tr>
<tr>
<td>Mar 06 - May 06</td>
<td>p = 0.75</td>
<td>Jan 06 - May 06</td>
</tr>
<tr>
<td>May 06 - Jul 06</td>
<td>p = 0.06</td>
<td>Jan 06 - Jul 06</td>
</tr>
<tr>
<td>Jul 06 - Sep 06</td>
<td>p = 0.62</td>
<td>Jan 06 - Sep 06</td>
</tr>
<tr>
<td>Sep 06 - Nov 06</td>
<td>p = 0.21</td>
<td>Jan 06 - Nov 06</td>
</tr>
<tr>
<td>Nov 06 - Jan 07</td>
<td>p = 0.59</td>
<td>Jan 06 - Jan 07</td>
</tr>
</tbody>
</table>

*Figure 4-4 Longitudinal Pass Rate t-Test Data*

However, when data were examined with the constant starting point of January 2006 (Figure 4-4), I did find that the mean pass rate change in homepage accessibility between January 2006 and November 2006 (M = 6.94, SD = 10.72, N = 12) was significantly greater than zero, t(11) = 2.24, two tail p = 0.05 (Figure 4-5), providing evidence that there was some form of an influence, to be discussed later, on the accessibility pass rate of homepages. I also found that a 95% confidence interval about mean pass rate accessibility change was [0.13, 13.75].
Similarly, between March 2006 and January 2007 (Figure 4-4), I did find that the mean pass rate change in homepage accessibility (M = 7.74, SD = 12.36, N = 12) was significantly greater than zero, t(11) = 2.18, two tail p = 0.05 (Figure 4-6), providing evidence that there was some form of an influence, as will be discussed, on the accessibility pass rate of homepages. A 95% confidence interval about mean pass rate accessibility change is [-0.11, 15.59].

### Table 1: Mean Pass Rate Change in Homepage Accessibility

<table>
<thead>
<tr>
<th></th>
<th>Mar-06</th>
<th>Jan-07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>71.24</td>
<td>78.97</td>
</tr>
<tr>
<td>Variance</td>
<td>58.79</td>
<td>128.67</td>
</tr>
<tr>
<td>Observations</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Pearson Correlation</td>
<td>0.21</td>
<td>0.21</td>
</tr>
<tr>
<td>df</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>t Stat</td>
<td>2.18</td>
<td>2.18</td>
</tr>
<tr>
<td>P(T&lt;=t) one-tail</td>
<td>0.03</td>
<td>0.03</td>
</tr>
<tr>
<td>t Critical one-tail</td>
<td>1.8</td>
<td>1.8</td>
</tr>
<tr>
<td>P(T&lt;=t) two-tail</td>
<td>0.05</td>
<td>0.05</td>
</tr>
<tr>
<td>t Critical two-tail</td>
<td>2.2</td>
<td>2.2</td>
</tr>
</tbody>
</table>

### Table 2: Mean Pass Rate Change in Homepage Accessibility

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Standard Error</th>
<th>Median</th>
<th>Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>7.74</td>
<td>3.57</td>
<td>2.38</td>
<td>0</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>12.36</td>
<td>38.1</td>
<td>-7.14</td>
<td>30.95</td>
</tr>
<tr>
<td>Sample Variance</td>
<td>152.67</td>
<td>292.86</td>
<td>7.85</td>
<td>7.85</td>
</tr>
</tbody>
</table>

Figure 4-5 Statewide Pass Rate: January 2007 – November 2006

Figure 4-6 Statewide Pass Rate: March 2006 – January 2007
After running multiple methods of statistical analysis, I discovered a significant difference between the pre and post statewide pass rates which is an indication that there was some form of influence over the period of the study. This influence could have been due to the reporting and continuous improvement requirements as set forth by IBHE or various accessible website design trainings provided throughout the 2006 year, or involvement of key accessibility promoters throughout the state and individual institutions, or even the possibility of natural progression of web design so as to include accessibility. In what follows, I qualitatively examine some of these various accessible website design influences throughout the state during 2006.

In consideration to statewide accessibility meetings and trainings over the period of the study, the Disabilities Advisory Committee of which I was a member, met either by phone or in person five times (2/24/06, 5/23/06, 6/14/06, 9/22/06, and 12/11/06). In previous years we had identified that website accessibility was an important issue and discussions in 2006 were based around identified issues as found in the baseline reporting requirements as directed by IBHE. Moreover, we had decided to sponsor and promote statewide trainings in our own
institutions so as to reach out to other institutions and further the continuous improvement models. As the year progressed, we reported on the offered and upcoming trainings.

During the 2006 year, IBHE partially sponsored (Illinois Board of Higher Education, 2005) web accessibility support for one institution until August of that year, SIUC, through the Higher Education Cooperation Act Grant. SIUC's Adaptive Computer Technology and Accessible Web Site Design grant was in its last year of a three year funding period and while accessible website design trainings were still offered, the focus of the grant during that time frame was the empowerment of individuals with disabilities and their respective adaptive technologies as they transitioned forward into the workplace. In total, I provided two grant supported accessible web design targeted workshops. One of these trainings was offered at SIUC and the other was held at John A. Logan Community College.

In a larger sense, and as promoted by the DAC committee, I had collaborated with UIUC in fostering accessible web design throughout the state. The results of these efforts were one online course, three workshops,
eight webcasts, two accessible website design support domains, and a publicly available website evaluation tool (FAE). All of these activities were evenly spread between the Spring 2006 and Fall 2006 semesters.

As I review accessibility activities during the 2006 year, personal notes, and experiential memories, I recall that it was a time when institutions were first beginning to have accessibility on their institutional radar. Specifically, they were figuring out how they were going to logistically handle the new, unfunded, reporting and continuous improvement requirements. As I have touched on previously, not every institution handled the reporting on accessibility and their respective continuous improvement plan in the same manner.

In an effort to portray how each of the 12 institutions handled this task and the types of accessible web design influences that were present during the time period of my study, I present a contextual review of both my quantitative and qualitative findings. I start with how each of the 12 Illinois universities accessibly presented their homepage at the beginning and end of the study as well as how accessible their homepages were on an overall and a bi-monthly basis. In addition, I then compliment this
data with qualitative data that is contextually focused upon the respective influences on the institutional accessible website design on goings.

**01 - Chicago State University (CSU)**

The January 2006 CSU site (Chicago State University, 2006a) was a static HTML page that utilized both inline and external cascading style sheet (Chicago State University, 2006b) in order to control the look and position for some of the content found within the page. The homepage also incorporated javascript in a manner that swapped in different images upon page reloads as well as providing the user with the current date. Information was also pulled in from The Weather Channel for an up to date presentation of Chicago's weather. Minus some sizing, positioning, cleaner code, and coding updates to make the page more visible to search engines such as Google, the January 2007 (Chicago State University, 2007a) site was, for the most part, a replication of the January 2006 (Chicago State University, 2006b) site.

In regards to the accessibility of these two pages, there was only a 2.4% increase (Figure 4-7) in the overall change from the beginning of the year until the end. In addition, and interestingly, the amount of failing elements
had increased by 2.38%. This overall increase can be attributed to the inappropriate utilization of styling elements. More specifically, the developer(s) of the 2007 page inaccessibly attempted to implement a technique used to bold and underline textual characters.

<table>
<thead>
<tr>
<th>CSU</th>
<th>Total Checks</th>
<th>Jan 5, 2006</th>
<th>Jan 3, 2007</th>
<th>Pass Change</th>
<th>Fail Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>42</td>
<td>61.9%/21.4%</td>
<td>64.3%/23.8%</td>
<td>+2.4%</td>
<td>+2.4%</td>
</tr>
<tr>
<td>Navigation &amp; Orientation</td>
<td>26</td>
<td>65.4%/23.1%</td>
<td>65.4%/23.1%</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>Text Equivalent</td>
<td>4</td>
<td>50.0%/25.0%</td>
<td>75.0%/00.0%</td>
<td>+25%</td>
<td>-25%</td>
</tr>
<tr>
<td>Scripting</td>
<td>4</td>
<td>25.0%/00.0%</td>
<td>75.0%/00.0%</td>
<td>+50%</td>
<td>----</td>
</tr>
<tr>
<td>Styling</td>
<td>6</td>
<td>66.7%/33.3%</td>
<td>33.3%/66.7%</td>
<td>-33.3%</td>
<td>+33.3%</td>
</tr>
<tr>
<td>HTML Standards</td>
<td>2</td>
<td>100%/00.0%</td>
<td>100%/00.0%</td>
<td>----</td>
<td>----</td>
</tr>
</tbody>
</table>

*Figure 4-7 CSU Pre/Post Results*

In relation to the statewide results, CSU was 8.3% below the statewide pass average in the beginning of the year and 14.7% below the statewide ending pass average (Figure 4-8). CSU had a fail rate that was 4.8% higher at the beginning of the year and 12.3% higher than the statewide average at the end of the study (Figure 4-9). With a closer examination, and as presented in Figure 4-8 and 4-9, I found that the CSU accessibility pass and fail rate was relatively constant throughout the 2006 year. The overall pass rate minimally increased 2% from 62% to 64%. In a non-expected way, the overall fail rate did not decrease but, rather, increased by 2% over the period of
Typically, when the pass score increases, an expected decrease in the fail score would also occur.

**Figure 4-8 CSU Longitudinal Accessibility Pass**

**Figure 4-9 CSU Longitudinal Accessibility Fail**

In addition to what had happened statistically throughout the year, I should note that CSU had indicated
in their 2006 Evaluation Plan for Improvement (Illinois Board of Higher Education, 2009a) that they were following Section 508 guidelines but had intended to shift to the more stringent IWAS guidelines. However, when they evaluated their site, they assessed it against the most stringent set of guidelines available which was W3C WCAG 1.0 AAA.

Interestingly, their only reported non-compliant were descriptions, keywords, and missing authors. However, when I assessed their January 2007 homepage with the same variables, there were seven categories of accessibility issues identified with some categories finding multiple problems. Appropriately, CSU might have tested a homepage available prior to January 2007 that did support their findings.

When comparing CSU's reported non-compliant issues (descriptions, keywords, and missing authors) with the issues that I had uncovered, an intriguing scenario was created. CSU provided the impression that they were quite accessible as compared to their actual accessibility. This scenario could have come about because of a few different reasons. First, many administrators, as well as the population at large, do not know about the various levels of stringency in regards to the different accessibility
guidelines. So, when the report was published, it carried high face validity with many, especially in relation to the lower standard they were using.

Second, it is also possible that the face validity of a full compliance rate outweighed the option of taking on a more stringent guideline as they had one day aspired to incorporate. Third, there exists the possibility that the low standard was chosen in a business model sense where only a minimal amount of time and effort would need to be expended in order to obtain and maintain a high appearance of accessibility. In any scenario, the end result was a pass and fail rate that remained relatively stable throughout the study albeit a high percentage of compliance with a low standard or around a 60% pass rate with a more stringent one.

02 - Eastern Illinois University (EIU)

EIU's January 2006 homepage (Eastern Illinois University, 2006a) was a static HTML site that utilized external cascading style sheets (Eastern Illinois University, 2006b) in order to control the placement and presentation of most of the information presented on the site. In order to randomly present various quotes and pictures so as to portray a dynamic site, the developer(s) implemented JavaScript as the control for both the visual
and textual representation of these changing elements. A year later, the EIU 2007 (Eastern Illinois University, 2007a) homepage implemented the same structure as the previous year's page.

By promoting the same HTML structure at the beginning and end of 2006, EIU replicated the same level of accessibility with the exception of leaving out a statement as to which character set to use. In other words, each language uses a certain set of characters to function and that set needs to be identified in order for web technologies to be fully functional. By leaving out this statement, the overall accessibility of the page decreased by 2.4% when comparing the pre and post sites in this study as presented in Figure 4-10. As would be expected, the presence of this inaccessibility element also caused an increase in fail percentage over the period of the study.

<table>
<thead>
<tr>
<th>EIU</th>
<th>Total Checks</th>
<th>Jan 4, 2006 Pass / Fail</th>
<th>Jan 2, 2007 Pass / Fail</th>
<th>Pass Change</th>
<th>Fail Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>42</td>
<td>71.4%/14.3%</td>
<td>69.0%/16.7%</td>
<td>-2.4%</td>
<td>+2.4%</td>
</tr>
<tr>
<td>Navigation &amp; Orientation</td>
<td>26</td>
<td>65.4%/19.2%</td>
<td>65.4%/19.2%</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>Text Equivalent</td>
<td>4</td>
<td>75.0%/00.0%</td>
<td>75.0%/00.0%</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>Scripting</td>
<td>4</td>
<td>75.0%/00.0%</td>
<td>75.0%/00.0%</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>Styling</td>
<td>6</td>
<td>83.3%/16.7%</td>
<td>83.3%/16.7%</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>HTML Standards</td>
<td>2</td>
<td>100%/00.0%</td>
<td>50.0%/50.0%</td>
<td>-50%</td>
<td>+50%</td>
</tr>
</tbody>
</table>

*Figure 4-10 EIU Pre/Post Results*
From the beginning of the 2006 year, the EIU homepage maintained an accessibility pass rating right around 70% (Figure 4-11). Similarly, the accessibility fail rate was level throughout the year (Figure 4-12). In relation to the statewide results, EIU was 1.2% above the statewide pass average in the beginning of the year and 9.9% below the statewide ending pass average. EIU’s fail rate that was 2.4% lower than the statewide’s at the beginning of the year and 5.2% higher than the statewide’s at the end of the study.

*Figure 4-11 EIU Longitudinal Accessibility Pass*
When examining their IBHE accessibility report, EIU stated that they had incorporated and met W3C WCAG 1.0 Priority 1 accessibility guidelines for their homepage with plans to meet Priority 2 by May 1, 2006 (Illinois Board of Higher Education, 2009b). In terms of accessibility, W3C WCAG 1.0 Priority 1 has the least amount of accessibility checkpoints out of all the available guidelines at that time. When I assessed their January 2006 homepage against their stated standard, I found that there were no definitive accessibility errors in the results. Similarly with their January 2007 homepage, no Priority 1 errors were found. However, the January 2007 homepage did have a few Priority 2 categorical errors which was the standard that they were striving for as reported to IBHE.
When EIU's homepage accessibility is examined from their perspective and respective standard, their homepage accessibility would have been portrayed as one that fared well with little to no room for improvement in relation to W3C's WCAG 1.0 Priority 1. Although, when evaluated against a more stringent standard, they maintained a steady 70% (+/- 2%) pass rate. This illusion of accessibility is similar to CSU’s representation of being highly compliant in relation to a low standard.

**03 - Governors State University (GSU)**

GSU's initial 2006 homepage was an HTML file that incorporated many lines of javaScript in order to accomplish visual effects to the viewer such as highlighting the “ABOUT GSU” (Governors State University, 2006a p. 1) button when said image is selected. An incorporation of mouse events was also apparent throughout the page which would require a user to move the cursor over various areas of the page in order to achieve a visual effect which was not available by any other means of access such as keyboard driven control. A year later, GSU altered the means for these visual effects by moving the controls away from the mouse requirements to their Cascading Style Sheet (Governors State University, 2007b), which afforded
accessible access while maintaining the visual effect.

When I examined data for change between the pre and post homepages, I found that the overall accessibility improved by 35.7% as presented in Figure 4-13. Furthermore, GSU improved their site in every aspect possible, which contributed to an overall accessibility score of 95.2%. This was the highest rating of all 12 institutions. Due to the use of a mouse driven control and not implementing proper markup for a table, the post page did not receive a 100% rating.

<table>
<thead>
<tr>
<th>GSU</th>
<th>Total Checks</th>
<th>Jan 1, 2006 Pass / Fail</th>
<th>Jan 1, 2007 Pass / Fail</th>
<th>Pass Change</th>
<th>Fail Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>42</td>
<td>59.4%/28.6%</td>
<td>95.2%/2.4%</td>
<td>+35.7%</td>
<td>-23.8%</td>
</tr>
<tr>
<td>Navigation &amp; Orientation</td>
<td>26</td>
<td>65.4%/23.1%</td>
<td>96.2/3.8%</td>
<td>+30.8%</td>
<td>-19.2%</td>
</tr>
<tr>
<td>Text Equivalent</td>
<td>4</td>
<td>25.9%/75.0%</td>
<td>100%/0.0%</td>
<td>+75.0%</td>
<td>-50.0%</td>
</tr>
<tr>
<td>Scripting</td>
<td>4</td>
<td>50.0%/0.0%</td>
<td>75.0%/0.0%</td>
<td>+25.0%</td>
<td>------</td>
</tr>
<tr>
<td>Styling</td>
<td>6</td>
<td>66.7%/33.3%</td>
<td>100%/0.0%</td>
<td>+33.3%</td>
<td>-33.3%</td>
</tr>
<tr>
<td>HTML Standards</td>
<td>2</td>
<td>50.0%/50.0%</td>
<td>100%/0.0%</td>
<td>+50.0%</td>
<td>-50.0%</td>
</tr>
</tbody>
</table>

*Figure 4-13 GSU Pre/Post Results*

In relation to the statewide results, GSU was 8.3% below the statewide pass average in the beginning of the year and 16.3% above the statewide ending pass average (Figure 4-14). GSU had a fail rate that was 9.5% higher than the statewide average at the beginning of the study and 9.1% lower than at the end of the study (Figure 4-15).
In regards to the bi-monthly change, I found that there were two points over the period of the study that stood out. The first was between January 2006 and March 2006 (Figure 4-14), which was just before the due date of the accessibility self report as required by IBHE (Illinois Board of Higher Education, 2006b). The second, and more drastic change occurred between November 2006 and January 2007. This spike occurred just before the Winter IBHE report was due.

*Figure 4-14 GSU Longitudinal Accessibility Pass*
When I examined GSU's self assessment and continuous improvement report as submitted to IBHE (Illinois Board of Higher Education, 2009c), I discovered that GSU had chosen to achieve compliance with Section 508 guidelines by June 2007 and had intentions of achieving compliance with IWAS by June 2008. During the interim, they had utilized UIUC's best practices for evaluation purposes. These are a more stringent set of guidelines as compared to Section 508. So, they chose to evaluate against a stringent standard then, in the future, implemented a less stringent standard.

In a reporting and continuous improvement sense, GSU did show a dramatic spike from 59.5% to 95.2% pass rate in the final month. Most likely, this could be due to the more stringent interim standard. As the end of the year
reporting time neared, they invested the time and resources necessary to improve on their site. I am not sure this would have been the case if they had originally evaluated and reported with a lower standard for they would have received a high rate of accessibility and therefore maintained an image of being an accessible institution.

**04 - Illinois State University (ISU)**

ISU's January 2006 homepage (Illinois State University, 2006a), as developed by their Institutional Web Support Services, controlled the look of some of textual elements such as the color of their links or the font of their headers through the use of an external cascading style sheet (Illinois State University, 2006b). However, locations of page elements were more controlled internally as evident through the multiple instances of `<p align="center">` throughout the HTML code. They had also implemented JavaScript in order to swap an array of institutionally promoting images into the page which had the effect of different images being present every time a user visited a page. ISU's Institutional Web Support Services had also incorporated tables as a method to control the layout of the page. Doing so afforded the designers a simplistic method of controlling the position of textual and image based information.
In January 2007, their homepage (Illinois State University, 2007a) had a similar look and feel as accomplished with both internal and external (Illinois State University, 2007b) cascading style sheets as well as javaScript. They also replaced their tables with cascading style sheet controls which accomplished a homepage that reacts in a fluid manner to user needs as well as cutting a few hundred lines of redundant code out of the 2006 homepage.

In regards to a change in accessibility between the pre and post homepages, ISU did improve. Overall, their post accessibility pass percentage was 81% which was up 11.9% from the previous year (Figure 4-13). Issues such as inappropriately implementing headers so as to assist with navigation and not describing an image with an alt tag held this page back from obtaining a higher score.

<table>
<thead>
<tr>
<th>ISU</th>
<th>Total Check</th>
<th>Jan 3, 2006 Pass / Fail</th>
<th>Jan 1, 2007 Pass / Fail</th>
<th>Pass Change</th>
<th>Fail Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>42</td>
<td>69.0%/16.7%</td>
<td>81.0%/9.5%</td>
<td>+11.9%</td>
<td>-7.14%</td>
</tr>
<tr>
<td>Navigation &amp; Orientation</td>
<td>26</td>
<td>65.4%/23.1%</td>
<td>73.1%/15.4%</td>
<td>+7.7%</td>
<td>-7.69%</td>
</tr>
<tr>
<td>Text Equivalent</td>
<td>4</td>
<td>75.0%/00.0%</td>
<td>75.0%/00.0%</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>Scripting</td>
<td>4</td>
<td>50.0%/00.0%</td>
<td>100%/00.0%</td>
<td>+50.0%</td>
<td>------</td>
</tr>
<tr>
<td>Styling</td>
<td>6</td>
<td>83.3%/16.7%</td>
<td>100%/00.0%</td>
<td>+16.7%</td>
<td>-16.67%</td>
</tr>
<tr>
<td>HTML Standards</td>
<td>2</td>
<td>100%/00.0%</td>
<td>100%/00.0%</td>
<td>------</td>
<td>------</td>
</tr>
</tbody>
</table>

Figure 4-16 ISU Pre/Post Results

In relation to the statewide results, ISU was 1.2% below the statewide pass average in the beginning of the
year and 2.0% above the statewide ending pass average (Figure 4-17). ISU had a fail rate that was equal to the statewide average at the beginning of the year and 2.0% lower than the statewide average at the end of the study (Figure 4-18). In consideration to how ISU's level of homepage website accessibility progressed over the period of the study, I found that the ISU accessibility pass and fail rate was relatively constant around 69% and 17% for half of 2006. Shortly thereafter, the accessibility pass rate spiked up to 90% and the fail rate dropped to 5% for the next two data extraction points. However, these rates did not hold as the fail percentage increased up to 10% and the pass percentage decreased down to 81% in the final month.

Figure 4-17 ISU Longitudinal Accessibility Pass
In response to IBHE's initial website evaluation report (Illinois Board of Higher Education, 2006a), ISU promoted Section 508 as their initial web accessibility guidelines (Illinois Board of Higher Education, 2009d). With these, they assessed their 25 most utilized webpages of which 23 out of 25 received a pass rating. While their evaluation list did include sites such as: Dean of Students, University Calendar, University Factbook, and a Visits to Campus website, the ISU homepage was not included.

However, when I evaluated their January 2006 homepage against Section 508 standards, they faired well with no automatic failures. Assuming that they kept their Section 508 standards throughout the year, a consistent accessibility rate would be expected rather than
drastically increasing their level of accessibility as found in the September 2006 evaluation. As I explored for a possible development of a higher web accessibility standard, I found that they continued to promote Section 508 after the spike (Illinois State University, 2006h). So, it would appear as if they had gone above section 508 guidelines for a few months. Even by doing so, they were still able to report on a high level of accessibility as compared to a low standard similar to how CSU and EIU had done.

Upon examination of other collected accessible website design data such as workshop offerings, I was unable to find any activities other than the upcoming winter URG report which might be related to this spike.

05 - Northeastern Illinois University (NEIU)

The January 2006 NEIU homepage (Northeastern Illinois University, 2006a) was a compilation of web design techniques which were composed of JavaScript, a user side site map, mouse events, and tables. The effect was a visually driven static homepage that required the use of a mouse in order to fully access all available elements. The developer(s) utilized JavaScript to drive the swapping out of images on the site map as a user wandered their mouse over various portions of the page.
At the end of the year, the NEIU homepage (Northeastern Illinois University, 2007a) had developed into a new look. They did this with a combination of the previous user side site map, mouse events and table design practices as well as incorporating an external cascading style sheet (Northeastern Illinois University, 2007b) for visual textual and position control on a large portion of page elements. The effect was a page that was more visually navigatable.

However, the visual alteration of the page did not necessarily have a positive impact on the accessibility of the page. In actuality, the new deployment created a new set of accessibility issues as NEIU transferred from one look to another. The previous homepage had issues with labeling images and using mouse events while the new page was more problematic with appropriately styling text within the HTML with inline centering and italicizing as well as using tables within tables for a visual effect which should be handled with a cascading style sheet. In all, NEIU accessibly increased by 4.8% when comparing pre and post sites. Similarly, their failure rate decreased by 2.38% as presented in Figure 4-19.
In relation to the statewide results, NEIU was 8.3% below the statewide pass average in the beginning of the year and ended the year with being 12.3% below the statewide pass average (Figure 4-20). NEIU had a fail rate that was 4.8% higher than the statewide average at the beginning of the year and 7.8% higher than the statewide average at the end of the study as shown in Figure 4-21.

Over the course of the study, NEIU's homepage did have an 8% increase in the overall pass accessibility rating in the beginning of the 2006 year, this score decreased 7% down to 67% at the end of the study. Similarly, the fail rate improved by dropping 7% but, then, by the end of the study had increased up to 19%.
In NEIU's initial 2006 web accessibility evaluation plan and report, they presented that they were supporting Section 508 at their institution and were committed to enhancing their web accessibility policy by the third
quarter of 2006 (Illinois Board of Higher Education, 2009e). They had also reported, as confirmed with their archived March 2006 homepage (Northeastern Illinois University, 2006c), that the only problem area on their homepage was their Flash based media, which they were attempting to remedy. As the year progressed, it would appear as if they kept with Section 508 guidelines, which they did not improve upon as evident in Figure 4-19. By keeping Section 508 guidelines, NEIU would be able to report near perfect accessibility rates in the same fashion that CSU, EIU, and ISU had done.

06 - Northern Illinois University (NIU)

The January 2006 NIU homepage (Northern Illinois University, 2006a) was a static HTML page that utilized JavaScript in order to swap in and out different images each time the page was loaded and also implemented external cascading style sheets (Northern Illinois University, 2006b) so as to control how some of the page elements, such as headers and table content, appear to the user. Additionally, NIU implemented mouse events in order to swap images as the user moved the cursor over specific areas of the webpage.

In January 2007, NIU's homepage (Northern Illinois University, 2007a) was presented in a more visually
minimalistic style. This was apparent by the previous year's page portraying eight images and the 2007 page showcasing only one. They had also adopted an internal cascading style sheet as well as building upon the external (Northern Illinois University, 2007b). Additionally, they continued the presentation of a swapped array of images and complimenting quotes with the continued adaption of JavaScript.

When examining any change of accessibility between the pre and post homepages as presented in Figure 4-22, NIU had remedied many inaccessible elements and increased their overall accessibility from 64.3% to 92.9%. Holistically, they had increased their level of accessibility in every subcategory. In actuality, they would have obtained a perfect score if they had provided a default language attribute as well as utilizing their headers in an appropriate manner i.e., h3 follows h2 follows h1.

<table>
<thead>
<tr>
<th>NIU</th>
<th>Total Check</th>
<th>Jan 1, 2006 Pass / Fail</th>
<th>Jan 6, 2007 Pass / Fail</th>
<th>Pass Change</th>
<th>Fail Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>42</td>
<td>64.3%/21.4%</td>
<td>92.9%/4.8%</td>
<td>+28.6%</td>
<td>-16.7%</td>
</tr>
<tr>
<td>Navigation &amp; Orientation</td>
<td>26</td>
<td>57.7%/30.8%</td>
<td>88.5%/7.7%</td>
<td>+30.8%</td>
<td>-23.1%</td>
</tr>
<tr>
<td>Text Equivalent</td>
<td>4</td>
<td>75.0%/00.0%</td>
<td>100%/00.0%</td>
<td>+25.0%</td>
<td>--</td>
</tr>
<tr>
<td>Scripting</td>
<td>4</td>
<td>50.0%/00.0%</td>
<td>100%/00.0%</td>
<td>+50.0%</td>
<td>--</td>
</tr>
<tr>
<td>Styling</td>
<td>6</td>
<td>83.3%/16.7%</td>
<td>100%/00.0%</td>
<td>+16.7%</td>
<td>-16.7%</td>
</tr>
<tr>
<td>HTML Standards</td>
<td>2</td>
<td>100%/00.0%</td>
<td>100%/00.0%</td>
<td>+50.0%</td>
<td>+50.0%</td>
</tr>
</tbody>
</table>

*Figure 4-22 NIU Pre/Post Results*
In relation to the statewide results, NIU was 8.3% below the statewide pass average in the beginning of the year and 13.9% above the statewide ending pass average (Figure 4-23). NIU had a fail rate that was 7.1% higher than the statewide average at the beginning of the year and 6.7% lower than the statewide average at the end of the study (Figure 4-24). As evident in Figure 4-17, NIU's accessibility pass rating stayed between 62% and 64% rating from the beginning of the year up until the November 2006 reading, at which time it spiked up to the 93% rating (Figure 4-23). In addition, their fail rating drastically decreased in November 2006 and went from a 21% to 5% (Figure 4-24).
In consideration to activities that were available as a positive influence to NIU's accessible web presence, a few instances did stand out. To begin, Elizabeth Leake of NIU's Information Technology Services hosted a January 13, 2006 website accessibility workshop which was led by Dr. Jon Gunderson of University of Illinois Urbana-Champaign (2009). In addition, NIU's plan for continuous improvement (Illinois Board of Higher Education, 2009f) was to assess their top 25 used sites for accessibility against IWAS, homepage included, and notify developers of recommended improvements by June 1, 2006. Furthermore, it should be noted that Sue Ouellette, Professor and Chair of the Department of Communicative Disorders at NIU was a member of Illinois Board of Higher Education's (IBHE) Disability
Advisory Committee (DAC) throughout the 2006 year.

When the quantitative data is compared to the qualitative data in this scenario, it would appear as if the major change was in November 2006. One major influence for this change was Elizabeth Leake. My conversations with her led me to understand that she was the one who wrote the original report and had applied pressure to improve the page at the end of the year so the institution could show that they had improved. It is interesting to note that making these accessibility changes is not a significant amount of work. The drastic increase NIU achieved could have been accomplished in an afternoon worth of work.

07 - Southern Illinois University Carbondale (SIUC)

In January 2006, SIUC's homepage (Southern Illinois University Carbondale, 2006a) utilized a JavaScript method to control the visual behavior of menus and submenus which, interestingly, afforded interaction with both the keyboard and mouse driven methods. They had also utilized an external cascading style sheet (Southern Illinois University Carbondale, 2006b) to control the textual appearance for content within their page for non-specific browsers. In addition, they had provided five specific browser external cascading style sheets which would, assumably, customize the visual representation of text as
loaded on different browsers. They had also utilized tables for layout and JavaScript in order to rotate images upon reloads.

In January 2007, SIUC's homepage was not archived and it was necessary to proceed backwards in time among the archived sites so as to obtain the homepage candidate that was being presented in January 2007. The closest archived page was September 4, 2006 and it was utilized as a representation of the SIUC homepage from that point until the necessary January 2007 comparison point. Here, the homepage (Southern Illinois University Carbondale, 2006d) is a structural replication of the pre homepage (Southern Illinois University Carbondale, 2006a). With the exception of a JavaScript presenting the date, a new set of showcased images, and the undated headlines presenting date specific stories, the naked eye would have difficulty identifying a difference.

These two homepages, pre and post, offered the same visually structured representation with only one distinguishing point of accessibility that caused these pages to accessibly differ. On the post homepage, SIUC did not appropriately include the code necessary to describe an image to an individual who does not access visual material through a visual medium. By not appropriately including
this code, SIUC's post homepage actually decreased in overall accessibility by 2.4% (Figure 4-25).

<table>
<thead>
<tr>
<th>SIUC</th>
<th>Total Checks</th>
<th>Jan 1, 2006 Pass / Fail</th>
<th>Jan 1, 2007 Pass / Fail</th>
<th>Pass Change</th>
<th>Fail Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>42</td>
<td>71.4%/11.9%</td>
<td>69.0%/14.3%</td>
<td>-2.4%</td>
<td>+2.38%</td>
</tr>
<tr>
<td>Navigation &amp; Orientation</td>
<td>26</td>
<td>73.1%/15.4%</td>
<td>73.1%/15.4%</td>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td>Text Equivalent</td>
<td>4</td>
<td>75.0%/00.0%</td>
<td>50.0%/25.0%</td>
<td>-25.0%</td>
<td>-------</td>
</tr>
<tr>
<td>Scripting</td>
<td>4</td>
<td>50.0%/00.0%</td>
<td>50.0%/00.0%</td>
<td>-------</td>
<td>+25.0%</td>
</tr>
<tr>
<td>Styling</td>
<td>6</td>
<td>83.3%/00.0%</td>
<td>83.3%/00.0%</td>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td>HTML Standards</td>
<td>2</td>
<td>50.0%/50.0%</td>
<td>50.0%/50.0%</td>
<td>-------</td>
<td>-------</td>
</tr>
</tbody>
</table>

*Figure 4-25 SIUC Pre/Post Results*

In relation to the statewide results, SIUC was 1.2% above the statewide pass average in the beginning of the year and 9.9% below the statewide ending pass average (Figure 4-26). SIUC had a fail rate that was 4.8% lower at the beginning of the year and 2.8% higher than the statewide average at the end of the study (Figure 4-27).

In consideration to accessibility changes that occurred throughout the year, I found that the SIUC accessibility pass and fail rate was somewhat stable throughout the 2006 year. Overall, the initial pass score dropped 2% from 71% to 69% and then stayed there for the rest of the study (Figure 4-26). In a similar fashion, the fail rate became slightly worse and then remained at a 14% rate for the rest of the year (Figure 4-27).
During the period of the study, I participated in many accessible design activities throughout the state. These included leading grant driven workshops, collaborating with
other institutions, and working in one on one consultations with web developers and administrators. As SIUC developed their response to the Illinois Board of Higher Education accessibility reporting requirement (Illinois Board of Higher Education, 2009g), they administratively decided against my Best Practices recommendation and initially chose to adhere to Section 508 for the purposes of developing an accessibility baseline from which to grow. To further expand, SIUC’s concept of growth was to increase the number of pages that were periodically checked, for SIUC already had a January 2006 policy that postulated Section 508 compliance for all new webpages (Illinois Board of Higher Education, 2009g).

During that time I was also requested to review a draft of the report and provide my input. The report that I received indicated two out of 25 web pages checked had failed Section 508 requirements. I ran the same assessment and found that eight out of 25 had failed including the SIUC homepage. I was informed that my findings were wrong with the homepage being used as an example and that the data would be updated to reflect pass ratings. After I pointed out the homepage accessibility error, I was informed that the error would stay in the report.

Because SIUC decided to adhere to a low standard, SIUC
reported a level of accessibility found in their homepage. Thus, similar to CSU, EIU, and ISU they were able to report a high level of homepage compliance to a low standard which they did not improve upon as apparent in Figure 4-26.

08 - Southern Illinois University Edwardsville (SIUE)

The developer(s) of the January 2006 SIUE homepage (Southern Illinois University Edwardsville, 2006a) controlled the visual representation of their content through a combination of an external cascading style sheet (Southern Illinois University Edwardsville, 2006b) and JavaScript. They did not use tables to locate image and textual content but, rather, created a homepage capable of fluid technological transitions as supported through the external cascading style sheet. The purpose of the JavaScript was to rotate an array of images upon reloads and revisits and also to have submenus appear as the user scrolls the cursor over various page navigation areas with the mouse.

Upon examination of the browser rendered January 2007 homepage (Southern Illinois University Edwardsville, 2007a), it becomes evident that SIUE maintained the same structural layout. In fact, my examination of the HTML code revealed that the page was almost identical to the January 2006 homepage (Southern Illinois University Edwardsville,
2006a). When I compared the visual driving code of the January 2007 cascading style sheet (Southern Illinois University Edwardsville, 2007b) with the previous year's, only two lines of code out of the 170 plus lines were different which controlled the visual effect of h1 and h2.

When comparing the pre and post SIUE pages, it becomes apparent that the institution had worked with the structure they had and built upon it in an accessible fashion without altering the look or feel a sighted person might obtain when viewing these homepages. Overall, the SIUE's pre homepage had a 76.2% (Figure 4-28) accessibility rating with some navigation and orientation, text equivalent, and scripting issues. One year later, SIUE had addressed these issues and increased their accessibility pass rating up to 92.9% which was a 16.7% increase (Figure 4-28). If SIUE had replaced mouse events with a more accessible medium and appropriately labeled their forms, they would have received a perfect rating on their January 2007 homepage.
<table>
<thead>
<tr>
<th>SIUE</th>
<th>Total Check</th>
<th>Jan 3, 2006 Pass / Fail</th>
<th>Jan 6, 2007 Pass / Fail</th>
<th>Pass Change</th>
<th>Fail Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>42</td>
<td>76.2%/11.9%</td>
<td>92.9%/4.8%</td>
<td>+16.7%</td>
<td>-7.14%</td>
</tr>
<tr>
<td>Navigation &amp; Orientation</td>
<td>26</td>
<td>69.2%/19.2%</td>
<td>92.3%/7.7%</td>
<td>+23.1%</td>
<td>-11.54%</td>
</tr>
<tr>
<td>Text Equivalent</td>
<td>4</td>
<td>75.0%/00.0%</td>
<td>100%/00.0%</td>
<td>+25%</td>
<td>-------</td>
</tr>
<tr>
<td>Scripting</td>
<td>4</td>
<td>75.0%/00.0%</td>
<td>75.0%/00.0%</td>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td>Styling</td>
<td>6</td>
<td>100%/00.0%</td>
<td>100%/00.0%</td>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td>HTML Standards</td>
<td>2</td>
<td>100%/00.0%</td>
<td>100%/00.0%</td>
<td>-------</td>
<td>-------</td>
</tr>
</tbody>
</table>

*Figure 4-28 SIUE Pre/Post Results*

When comparing SIUE's results to statewide results, SIUE was 6.0% higher than the statewide pass average in the beginning of the year and 13.9% higher than the statewide ending pass average (Figure 4-29). As for fail rate comparisons, SIUE had a fail rate that was 4.8% lower at the beginning of the year and 6.7% lower than the statewide average at the end of the study (Figure 4-30).

Upon examination of SIUE's homepages over the period of the study, I found a definitive point between March 2006 and May 2006 where the accessibility pass percentage jumped from 76% up to 93% (Figure 4-29). SIUE maintained this rating for the rest of the study. While not as drastic, the accessibility fail rate decreased by 7% during the same time period down to 5% where it remained for the rest of the study (Figure 4-30).
In relation to accessible design practices of SIUE, they had reported to IBHE before the May deadline that their homepage was 100% compliant with Section 508 and W3C.
standards (Illinois Board of Higher Education, 2009h). However, the level of W3C standards that were used was not indicated. In addition, they had used UIUC's FAE as the tool to assess conformity to their chosen standards. Over the year, SIUE was able to drastically improve upon their level of website accessibility. As for the spike between the March 2006 and May 2006, the only outside factor associated with this increase was the initial reporting deadline as imposed by IBHE (Illinois Board of Higher Education, 2009h).

09 - University of Illinois Chicago (UIC)

UIC's January 2006 homepage (University of Illinois Chicago, 2006a) used 326 lines of HTML code so as to render a page which utilized tables, internal and external cascading style sheets (University of Illinois Chicago, 2006b), and JavaScript. The tables were used for layout purposes, the cascading style sheets were used to control the look and location of elements such as text and pictures within the table, and the JavaScript's purpose was to alternate images and quotes.

UIC's January 2007 homepage (University of Illinois Chicago, 2007a) was almost a perfect replication, right down to the external cascading style sheet (University of Illinois Chicago, 2007b) and JavaScript of the previous
year's homepage. When comparing html code line by line, the newer page was only a five-line difference (326 vs 321). The only difference was the addition of a faculty link in the header. So, any visitor viewing either of these pages would most likely assume that they were the same.

In terms of accessibility, UIC had also replicated all of their previous accessibility issues with the exception of one which was the use of alt tags for images. The issues that were still apparent were the inappropriate use of headings, labels, mouse driven events, structural markup, and nested tables. While there was a minor increase from 69.0% to 71.4% as caused by placing a single alt tag on a spacer image, there was no considerable time or effort provided in the area of accessibility between the pre and post homepages (Figure 4-31).

<table>
<thead>
<tr>
<th>UIC</th>
<th>Total Checks</th>
<th>Jan 1, 2006 Pass / Fail</th>
<th>Jan 2, 2007 Pass / Fail</th>
<th>Pass Change</th>
<th>Fail Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>42</td>
<td>69.0%/14.3%</td>
<td>71.4%/11.9%</td>
<td>+2.40%</td>
<td>-2.38%</td>
</tr>
<tr>
<td>Navigation &amp; Orientation</td>
<td>26</td>
<td>73.1%/15.4%</td>
<td>73.1%/15.4%</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>Text Equivalent</td>
<td>4</td>
<td>50.0%/25.0%</td>
<td>75.0%/00.0%</td>
<td>+25%</td>
<td>-25%</td>
</tr>
<tr>
<td>Scripting</td>
<td>4</td>
<td>50.0%/00.0%</td>
<td>50.0%/00.0%</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>Styling</td>
<td>6</td>
<td>66.7%/16.7%</td>
<td>66.7%/16.7%</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>HTML Standards</td>
<td>2</td>
<td>100%/00.0%</td>
<td>100%/00.0%</td>
<td>----</td>
<td>----</td>
</tr>
</tbody>
</table>

*Figure 4-31 UIC Pre/Post Results*
In comparison to the statewide results, UIC was 1.2% below the statewide pass average in the beginning of the year and 7.5% below the statewide ending pass average (Figure 4-32). UIC had a fail rate that was 2.4% lower than the statewide rate at the beginning of the year and 0.4% higher than the statewide average at the end of the study (Figure 4-33).

During the period of this study, UIC started with a 69% pass percentage, increased by 2% halfway through the year, and finished out with a 71% accessibility evaluation score (Figure 4-32). This pattern was also evident with the fail score. It started at 14% then dropped to 12% where it stayed for the remaining of the study (Figure 4-33).

Figure 4-32 UIC Longitudinal Accessibility Pass
In 2006, UIC was committed to compliance with UIUC's Best Practices for User Centered Web Design (Illinois Board of Higher Education, 2009i). In fact, their intent was to require that all new and altered pages would adhere to the UIUC Best Practices. However, the responsibility for implementing this new level of compliance was to “be proportionate to the amount of staff reallocated” (Illinois Board of Higher Education, 2009i, p15). When further examined, no data was available concerning the reallocation of staff which might account for the consistent accessibility rates for 2006 (Figure 4-32, Figure 4-33).

10 - University of Illinois Springfield (UIS)

In January 2006, UIS had deployed a homepage
(University of Illinois Springfield, 2006a) that incorporated a few different design techniques in order to achieve their web presence. One of those techniques was the use of flash, which was a banner like display that looped a set of promotional UIS images and quotes. They had also located page elements through the use of a table and controlled the look of their textual content with both an internal and external cascading style sheet (University of Illinois Springfield, 2006b). In an attempt to simplify the process of finding information within UIS sites, they had also included a search function.

In January 2007, UIS moved their homepage presentation (University of Illinois Springfield, 2007a) away from the looping flash presentation and took on a more static homesite portrayal. They had also completely moved away from controlling content layout with tables and took a more progressive approach by shifting the location of page elements to an external cascading style sheet (University of Illinois Springfield, 2007b). They also incorporated a site map in order to make various areas of an image linkable such as the picture of a star with the word Under Grad printed inside.

While the 2006 and 2007 homepages were visually different, they both represented contextually similar
media. As for how they compared in their accessibility percentages, they improved by 7.1% from 71.4% to 78.6% with a 9.5% decrease of inaccessible elements (Figure 4-34). Interestingly, the problematic accessibility areas found on the post page were also on the pre page such as the inaccessible use of titles, headings, form control labels, and a declared default language. The pre homepage also had accessibility issues with tables and text styling but these were removed when UIS adopted an external cascading style sheet (University of Illinois Springfield, 2007b) in order to separate content from style.

<table>
<thead>
<tr>
<th>UIS</th>
<th>Total Check</th>
<th>Jan 10, 2006 Pass / Fail</th>
<th>Jan 5, 2007 Pass / Fail</th>
<th>Pass Change</th>
<th>Fail Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>42</td>
<td>71.4%/21.4%</td>
<td>78.6%/11.9%</td>
<td>+7.1%</td>
<td>-9.5%</td>
</tr>
<tr>
<td>Navigation &amp; Orientation</td>
<td>26</td>
<td>61.5%/26.9%</td>
<td>65.4%/19.2%</td>
<td>+3.8%</td>
<td>-7.7%</td>
</tr>
<tr>
<td>Text Equivalent</td>
<td>4</td>
<td>100%/00.0%</td>
<td>100%/00.0%</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>Scripting</td>
<td>4</td>
<td>100%/00.0%</td>
<td>100%/00.0%</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>Styling</td>
<td>6</td>
<td>66.7%/33.3%</td>
<td>100%/00.0%</td>
<td>+33.3%</td>
<td>-33.3%</td>
</tr>
<tr>
<td>HTML Standards</td>
<td>2</td>
<td>100%/00.0%</td>
<td>100%/00.0%</td>
<td>------</td>
<td>------</td>
</tr>
</tbody>
</table>

*Figure 4-34 UIS Pre/Post Results*

When comparing to statewide results, UIS was 1.2% above the statewide pass average in the beginning of the year and 0.4% below the statewide ending pass average (Figure 4-35). UIS had a fail rate that was 4.8% higher at the beginning of the year and 0.4% higher than the statewide average at the end of the study (Figure 4-36). With a closer
examination, UIS's institutional homepage went through some minor accessibility changes throughout the year. Specifically, they decreased the overall fail accessibility rate. Originally, UIS started with a 21% score and dropped it down to 12% after a few months of work. In consideration of the overall pass score, UIS increased their score from 71% to 79%. As for examining the homepages on a bi-monthly basis, the only visually noticeable change was in July 2006 where both the pass (Figure 4-35) and fail (Figure 4-36) rates improved.

Figure 4-35 UIS Longitudinal Accessibility Pass
UIS's web accessibility report, as submitted to IBHE by May 2006, detailed their historical commitment to making their web pages accessible to all rather than designing them primarily for persons with disabilities (Illinois Board of Higher Education, 2009j). Their commitment went so far as to incorporate a page transcoder, as supported by the U of I system, which dynamically converted web content into a textural medium. I should note that such converters can be deemed as discriminating and not necessarily fully compliant with accessible guidelines due to a person with a disability being required to access a separately developed text based site. This action can be interpreted as those with special needs go to a separate area for the original
area was not developed with an integrated philosophy.

As for how UIS portrayed their homepage website accessibility in the first part of 2006, they stated that they aligned with W3C's WCAG 1.0 but did not state which level. When I further explored their report, I found that they had provided a list of errors that were of the Priority 1 ilk. Otherwise, no other errors were reported which would be an indication that they were only using the Priority 1 set of guidelines. This was confirmed as I tested their June 2006 homepage for which they claimed no errors. I found that there were Priority 2 and 3 errors but no Priority 1.

In UIS's 2006 IBHE accessibility report (Illinois Board of Higher Education, 2009j) they also indicated a recent post report update to their homepage. They indicated that their homepage was now error free. It is possible that their accessibility pass and fail rates remained relatively constant from this point on due to their perception that they were error free as supported by WC3 WCAG 1.0 Priority 1. In relation to other guidelines available at the time of this study, this was the least stringent of all due to the non-adherence to Priority 2 and 3 checkpoints.

11 - University of Illinois Urbana/Champaign (UIUC)

UIUC's pre homepage, January 2006 (University of
Illinois Urbana/Champaign, 2006a), completely separates content from style solely based upon their internal and external cascading style sheet (University of Illinois Urbana/Champaign, 2006b). The author(s) of this page developed a well structured html document that incorporated a mixture of javascript and html in a manner that offers the user search functions, navigation list boxes, as well as contextually linked images and text. The effect is a minimalistic homepage that categorizes institutional information into interest groups.

Structurally, the UIUC January 2007 homepage (University of Illinois Urbana/Champaign, 2007d) is a continuation of the year's previous homepage. With the exception of the replacing some content with a javascript and rss feed, the HTML code almost follows the exact same format. This is quite apparent when visually comparing the two pages. They look the same.

As for observed change between the pre-homepage and post-homepage, because UIUC followed the same structure with no accessibility alterations, they stayed at an 90.5% accessibility rating (Figure 4-37). The accessibility issues for both pages are few in number but, nonetheless, issues that hinder utilization of the UIUC institutional homepages exist. More specifically, the pages have elements
that require the use of a mouse, forms that are not labeled correctly, and no default language was proclaimed. If UIUC had addressed these issues over the year of the study, they would have obtained a perfect accessibility score.

<table>
<thead>
<tr>
<th>UIUC</th>
<th>Total Checks</th>
<th>Jan 1, 2006 Pass / Fail</th>
<th>Jan 4, 2007 Pass / Fail</th>
<th>Pass Change</th>
<th>Fail Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>42</td>
<td>90.5%/4.8%</td>
<td>90.5%/4.8%</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>Navigation &amp; Orientation</td>
<td>26</td>
<td>92.3/7.7%</td>
<td>92.3/7.7%</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>Text Equivalent</td>
<td>4</td>
<td>100%/0.0%</td>
<td>100%/0.0%</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
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<td>50.0%/0.0%</td>
<td>------</td>
<td>------</td>
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<td>------</td>
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<tr>
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<td>100%/0.0%</td>
<td>------</td>
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</table>

In relation to the statewide results, UIUC was 20.2% higher than the statewide pass average in the beginning of the year and 11.5% higher than the statewide ending pass average (Figure 4-38). UIUC had a fail rate that was 11.9% lower at the beginning of the year and 6.7% lower than the statewide average at the end of the study (Figure 4-39). Throughout the year of the study, UIUC deployed a consistently high overall accessibility pass score. Specifically, they kept a 90% score for every data gathering period with the exception of November 2006 where they elevated to 95% and then back down. In regards to UIUC's overall fail rate, it hovered at 5% for the whole study. Due to the use of mouse requirements and forms
without appropriate labels, UIUC did not obtain a perfect rating.

Figure 4-38 UIUC Longitudinal Accessibility Pass

Figure 4-39 UIUC Longitudinal Accessibility Fail
In 2006, UIUC was a major contributor to promoting and providing opportunities and resources for the development of accessible media. Brad Hedrick of UIUC's Division of Disability Resources and Educational Services served as a medium between UIUC's developments and IBHE's Disability Advisory Committee. Driving the actual developments such as the Web Accessibility Best Practices and the Functional Accessibility Evaluator, Jon Gunderson led multiple workshops and webcasts throughout the state during the period of the study. Overall, multiple institutions had incorporated the UIUC's Best Practices as well as utilized the Functional Accessibility Evaluator.

As I examined their initial 2006 web accessibility report (Illinois Board of Higher Education, 2009k) I found that they were supporting their own guidelines as they evaluated their institutional web presence. When comparing their efforts with their high rate of accessibility, it is evident that one influences the other. Their future plan was to continue their leadership role both internally and externally.

12 - Western Illinois University (WIU)

In January 2006, WIU had deployed a minimalistic styled static html homepage (Western Illinois University, 2006a). The developer(s) of this page located and styled
institutional information with an internal and an un-archived external cascading style sheet, and a basic layout table. The developer(s) had also included a method to search institutional sites.

Visually, in regards to layout and presentation, the WIU January 2007 homepage (Western Illinois University, 2006b) remained the same as the January 2006 homepage. Furthermore, they used the same table and cascading style sheet structure found within the previous year's HTML code in order to maintain the same institutional homepage interface.

As for accessibility change between the pre and post homepages, WIU stayed at a 76.2% accessibility pass rating (Figure 4-40). However, their fail rating actually increased from 11.9% to 14.3%. In further detail, the text equivalent category had a previous warning in regards to alt tag use. This warning was made fully accessible in the post homepage and added one more pass to the overall pass checkpoints yet it did not affect the fail change score. However, WIU introduced an inaccessible label in the post homepage which added one more fail to the overall checkpoints without taking away any pass elements. Overall, these two issues caused an increase in the pre text equivalent pass rating, a decrease in the pre and decrease
in the post navigation and orientation rating, and an overall increase in the fail rating.

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<td>Overall</td>
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<tr>
<td>Navigation &amp; Orientation</td>
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<td>65.4%/23.1%</td>
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<td>100%/00.0%</td>
<td>100%/00.0%</td>
<td>-----</td>
<td>-----</td>
</tr>
</tbody>
</table>

**Figure 4-40 WIU Pre/Post Results**

In relation to the statewide results, WIU was 6.0% above the statewide pass average in the beginning of the year and 2.8% below the statewide ending pass average (Figure 4-41). WIU had a fail rate that was 4.8% lower than the statewide average at the beginning of the year and 2.8% higher than the statewide average at the end of the study (4-42). Over the period of the study and with the exception of one 2% drop and rise in the overall accessibility score, WIU maintained a homepage with a 76% score. In a similar fashion, the overall fail score started at 12%, increased 2% to 14% where it stayed for the rest of the year.
In consideration to what WIU was doing in the area of accessible website design and policy over the period of the study, they had indicated an incorporation of the IWAS as
an institutional standard in their May 2006 IBHE web
accessibility report (Illinois Board of Higher Education,
2009). In regards to their level of self-reported
accessibility, they had reported that they had minor
problems but that these would be addressed in their new
site that was being developed. At the end of this study,
their homepage was a structural and visual replication of
their January 2006 homepage. With intentions of creating a
new, more accessible homepage, it is apparent that they did
not commit resources in the alteration of their old model.

**Overall Findings**

In sum, the state as a whole improved over the one year
period from January 2006 and January 2007. The removal of
inaccessible elements made the pass rate increase and the
fail rate decrease. IBHE’s request was heard and
institutions reacted. Interestingly, as the aggregate data
is separated out for a closer look at each institution, I
found that individual institutions reacted differently to
IBHE’s request. Some took on a high standard and strived to
meet it while others took on a lower standard and
maintained an illusion of being highly accessible.

I also found that some institutions with accessibility
advocates on staff had a higher standard and homepages that
were more accessible than others. However, this was not
always true as in my own case where SIUC chose to look good with a lower standard. In the final chapter I discuss this issue as well as other conclusions from the study. I also offer recommendations for both practice and future research.
CHAPTER 5

SUMMARY OF THE STUDY

The purpose of my study was to examine the magnitude of the gap between accessibility requirements and actual practices of accessible website deployment. More specifically, I examined the relationship between the accessibility of Illinois postsecondary institutional homepages and the Illinois Board of Higher Education (IBHE) requirements for institutions to implement web accessibility standards and continuously improve website accessibility. I chose to conduct my study in 2006 because that was the first time a policy was in place to require reporting on Illinois public university website accessibility as well as the requirement to implement a continuous plan.

In order to operationalize the possible gap between accessibility requirements and actual practices of accessible website deployment, I developed the following research questions:

1. To what extent did Illinois postsecondary institutional homepages meet accessibility guidelines at the start and end of the IBHE 2006 accessibility reporting requirements?
2. What factors might have influenced changes in website accessibility over time?

I answered these research questions in several phases. During the first phase, I harvested 84 archived institutional homepages from Internet Archive’s Wayback machine. During the second phase, I assessed each one of the homepages for its level of accessibility with UIUC’s Functional Accessibility Evaluator. I then statistically analyzed the data in the third phase and during the final phase, I examined the quantitative findings for spikes and trends. Using these trends, I then attempted to align my quantitative data with qualitative data I gathered during the time of the study. The following is a discussion of the overall statistical significance that I found, individual institutional performance and possible influences on what I found, conclusions, and recommendations.

Discussion of Findings - Research Question One

My first research question, to what extent did Illinois postsecondary institutional homepages meet accessibility guidelines at the start and end of the IBHE 2006 accessibility reporting requirements was addressed by harvesting data from all 12 of the Illinois postsecondary institutions, assessing them for accessibility, and then statistically analyzing them for significant changes. For
each institution, I determined a January 2006 accessibility rate and a January 2007 rate. I also looked at the state accessibility rate as a whole.

Overall, the state started with a 70.2% pass rate and finished with a 79.0% pass rate. When the aggregate of all pre and post pass rates was analyzed to test my hypothesis (Ho: prpre - prpost = 0?), I found that there was a statistically significant change in the statewide accessibility rates. More specifically, when I conducted a paired t-test with an alpha level of 0.05, the mean pass rate change in homepage accessibility (M = 8.73, SD = 12.32, N = 12) was significantly greater than zero, t(11) = 2.45, two tail p = 0.03 with a 95% confidence interval about mean pass rate accessibility change of [0.90, 16.56].

In consideration to the statewide fail rates, the statewide results started with a 16.7% and dropped down to 11.5%. When the aggregate of all pre and post fail rates was analyzed to test my hypothesis (Ho: frpre - frpost = 0?), I found that there was not a statistically significant change in the statewide accessibility rates. More specifically, the mean fail rate change in homepage accessibility (M = -5.16, SD = 8.72, N = 12) was not significantly greater than zero, t(11) = 2.05, two tail p = .03, failing to provide evidence that there was a strong
enough influence such as accessibility trainings on the accessibility fail rate of homepages. In addition, a 95% confidence interval about mean fail rate accessibility change was [.038, -10.07]. While a mean change from 16.67 in January 2006 to 11.51 in January 2007 might appear significant, the lack of statistical significance might be due to high variation and standard error relative to the mean difference.

To ensure that the state did not experience a pass rate jump from one data extraction point to the next, I also assessed bi-monthly data for a statistically significant change from one point to the next. I found that the time frame between comparisons was either too short, did not change enough, or was a combination of both. In order to ascertain if there was a statewide level of significant change in the beginning quarter of the year and the last quarter of the year, I assessed with the constant starting point of January 2006 and ran paired t-test with each consecutive data point. I also did this with a constant ending point of January 2007 and ran paired t-tests with each previous data point. What I found was statistical significance for pass change between January 2006 and November 2006. I also found significance between March 2006 and January 2007.
So, to directly answer my first research question in regards to what extent Illinois postsecondary institutional homepages met accessibility guidelines at the start and end of the IBHE 2006 accessibility reporting requirements, the pass rate change from 70.2% to 79.0% was great enough to be considered statistically significant between January 2006 and January 2007. Furthermore, the statewide pass rate was great enough to be considered statistically significant between January 2006 and November 2006 as well as March 2006 and January 2007.

What these results indicate are that, as a whole, IBHE’s requirement to report upon website accessibility and continuously improve the accessibility of electronic resources had a statistically significant positive effect on statewide public universities as a whole. Furthermore, when I examined statewide data on a bi-monthly basis, I found a gradual, continuous improvement trend.

The fact that Illinois schools responded to pressure from IBHE is consistent with institutional theory, which I briefly introduced in Chapter 1. This theory is based on the assumption that in order for institutions to survive and prosper, it is imperative that they respond to social, political, and economic trends and demands (Scott & Meyer, 1983). Moreover, institutions want to look good and gain
legitimacy, largely because their resources can be negatively affected when they don’t comply to imposed rules and norms (DiMaggio & Powell, 1983). At times, it is possible that the creation and maintenance of a positive external perception becomes more important than actual improvement or compliance, as I found in my research. It is through this theoretical lens that I contextually frame the presentation of my qualitative discussion as it pertains to the alignment and explanation of the statistical trends and patterns I identified.

Discussion of Findings – Research Question Two

Interestingly, the bi-monthly, continuous improvement trend I found for the statewide aggregate data was not necessarily true for individual institutions. As I examined my quantitative data results, I found that there were a few evident data patterns or trends. The first was a spike trend; the second was a high standard, high accessibility trend; and the third was a low standard, high accessible illusion trend. I draw on these trends to answer my second research question that inquired as to what factors might have influenced changes in website accessibility over time.

Accessibility Spike Trend

Out of the 12 institutions in my study, four of them had spikes in their levels of accessibility. SIUE spiked in
May 2006, ISU did so in September 2006, NIU increased in November 2006, and GSU followed suit in January 2007. As for what caused the spikes, there are a few possibilities. The first could be directly related to human psychology and the pressure of deadlines. For example, SIUE spiked just before the initial reporting deadline and ISU, NIU, and GSU all spiked during the time that the end of the year report was being drafted. According to many (Akerlof, 1991; Ariely & Wertenbroch, 2002; Dewitte & Lens, 2000; O’Donoghue & Rabin, 2001;), humans have a tendency to procrastinate for a multitude of reasons. Although this might have been an influence as to why a spike was evident, I postulate that there could have been at least two other issues that can help make sense of this spike.

First, in alignment with institutional theory, if an institution is to survive, it needs to respond to social, political, and economic pressures (Hanson, 2001; Scott, 1992; Scott & Meyer, 1983). By spiking their pass rates, these institutions not only conspicuously complied with a continuous improvement requirement, but also created a strong accessibility presence. Doing so ensured that they appeased the IBHE’s politics of looking good, society’s need for accessible websites, and didn’t potentially
negatively affect their economic status by not looking accessible for students with disabilities.

A second possible reason for the spikes is that tight budgets and stretched personnel were a commonplace during the time of my study. When an unfunded mandate came into an office, such as to learn about and report on the accessibility of an institution’s web presence, the task was put in a queue behind more chronologically pressing issues. As the deadline neared, personnel fixed their pages, submitted their reports, and moved onto the next pressing issue. For SIUE, they did this at the beginning of the year and ISU, NIU, and GSU at the end.

**High Standard, High Accessibility Trend**

A second trend that I was able to identify was one where institutions that assessed to a higher standard, finished the year with a higher than average accessibility pass rate. While not all institutions that used a high standard started out with a high accessibility pass rate, four out of six of them (GSU, NIU, SIUE, UIUC) ended up with the four highest accessibility rates. In addition, three out of the four (GSU, NIU, SIUE) had the highest amount of change over the period of the study. As perceived through institutional theory, these universities appeared to have strived to gain external recognition through their
actions. By choosing a stringent standard, they expressed their commitment to create a functionally accessible electronic environment.

In simplistic terms, those institutions that took on the challenge of a higher standard accomplished two important things in the world of accessible website design. First, by striving for the higher standard, three of the four schools with higher accessibility pass rates ended the year with the largest amount of change. Because of this amount of change, I believe that the significance found in the statewide change could be primarily attributed to the accessible website design work implemented by these three universities.

Second, by selecting a higher standard, there exists an implicit commitment to truly creating an accessible electronic environment. More so, even if they were unable to fully implement the guidelines to achieve a high rate of pass compliance such as UIC and WIU, they created a good baseline as to what would need to be done in the future for better compliance. In doing so, I believe that they embraced IBHE’s intent of continuous improvement.

As for possible reasons why UIC and WIU were unable to achieve a high level of compliance, at the time WIU was working on a new page and it is unlikely that they would
have expended resources on their soon to be replaced page. In a sense, this does fit the continuous improvement model because they reported to IBHE that they would develop the new page in accordance with the higher IWAS standard (Illinois Board of Higher Education, 2009). The second high standard school that did not raise their accessibility rate similar to others was UIC. In their report, they claimed that they would apply the new standards as personnel became available. It is possible that by the end of the study, UIC did not have the available personnel they deemed necessary in order to develop compliance with the higher standard.

Aside from taking on the challenge of a high standard and embracing IBHE’s concept of continuous improvement, GSU, NIU, SIUE, UIUC, UIC, and WIU also did this at the expense of not looking perfect in their report to IBHE. If they had chosen a low standard such as Section 508, they would only have needed to meet 16 guidelines in order to create the appearance that they were highly accessible. In addition, they would have had to expend less work and energy in order to create this illusion. This is what it seems like several of other institutions did, as I will discuss below.
**Low Standard, High Accessible Illusion Trend**

The third trend that I was able to identify from the quantitative data was one of an accessibility illusion. As my results started to take shape, I noticed that about half of the institutions had accessibility pass rates (CSU’s Figure 4-8, EIU’s Figure 4-11, NEIU’s Figure 4-20, SIUC’s Figure 4-26, and UIS’s Figure 4-35) that remained relatively constant, about 68%, throughout the whole study. As I researched further, I noticed that each one of them had chosen one of the least stringent standards to assess their homepages and by doing so, was able to report a relatively high level of accessibility.

Similar to how I used institutional theory to frame an explanation for previous spiked scores and high standard, high accessibility rate trends, this theory also applies to this identified trend. Again, in order for the institutions in my study to prosper, it was imperative for them to respond to social and political pressures (Hanson, 2001; Scott, 1992; Scott & Meyer, 1983) in a fashion that legitimizes them. When IBHE shined a light on them, it might have appeared more important to look good rather than to take the risk of instituting a high standard and only looking average, or worse.
My experience at SIUC can attest to this trend of establishing a low benchmark standard. As a drafter of IBHE’s reporting guidelines (Illinois Board of Higher Education, 2006b), I discussed with SIUC’s Office of Media and Communication the intent of reporting requirements and how they relate to the continuous improvement plan. After lobbying for a higher standard, I discovered that SIUC continued their support of Section 508, rather than the more stringent standards. Instead of using the higher standards, SIUC increased the amount of pages assessed using less rigorous standards in response to the continuous improvement requirement.

To further support my suspicion that the use of lower standards was to enable SIUC to look good (as opposed to promoting an in depth effort to create highly accessible websites), when a draft of the report came across my desk for review, it had inaccurate data throughout. As I brought these errors to the attention of the author, they were contested until I connected specific lines of code to the corresponding guideline.

On the other side of the coin of creating the illusion of looking good, Jon Gunderson of UIUC, and Elizabeth Leake of NIU were able to work with their institutional administrative representatives for their respective
homepages and to successfully lobby for use of a higher standard. Consequently, they had a higher institutional homepage accessibility pass rate which translated into a truly more inclusive environment.

Conclusions and Implications

My study has implications for practice, theory, and research. As far as I can tell, my study was the first time that institutional theory lens was used to explore institutional responses to an accessible web design and continuous improvement requirement. Using this lens can help us to better understand how institutions respond not only to accessibility requirements, but also to policy requirements in general. This work also expands upon the knowledge base of what was previously known about the assessment and accessibility of institutional web sites.

Practice

As I introduced in Chapter 1, the significance of this study was to provide policymakers, administrators, and web designers with a perspective as to whether or not policy has an affect on accessible website design practice. As shown, policy did have a significant affect on the pass rate of Illinois postsecondary institutions in 2006. However, the implications of my research go further than knowing that the policy I researched had an affect on
practice.

I found that it appeared as if some institutions strove to look good rather than be good. In the larger scope of things, when administrators develop policies, it is imperative that this potential behavior is taken into consideration and appropriately addressed if a policy is to succeed as intended. Also, when evaluation and reporting are integral components to policy, they should be done in a standardized manner. Not doing so can lead to a misrepresentation of data.

On an institutional level, administrators need to prepare for more accessibility initiatives as driven by administrative bodies, the courts, or by other means. Students with disabilities have the right to participate in a non-discriminatory manner. In order to provide an equal opportunity for these students, it is imperative that institutions proactively address the issue of electronic accessibility both inside and outside the classroom. This means that institutions should develop and implement a realistic accessible electronic integration plan. In order to begin such a plan, institutions should consider a number of questions:

1. Who is responsible for the development of electronic resources?
2. What training is necessary to bring developers up to speed on accessible design?
3. What social, physical, and electronic barriers are in existence and how are they to be removed?
4. What level of accessibility will be required and to what resources will it apply?
5. Who has administrative oversight on accessibility initiatives?
6. Who is responsible for enforcement of policies?
7. What resources are necessary to support electronic accessibility?

By answering these questions, institutions will be well on their way to creating more accessible electronic environments.

Theory

Prior to my research, institutional theory had not been used as the theoretical framework for a study of accessible web design policies and practices. This framework proved to be invaluable when understanding why a particular institution would strive to look good in both political and public eyes. In sum, each institution wanted to gain legitimacy through the appearance of conformance to IBHE’s reporting and continuous improvement requirements.

My research supports and furthers the knowledge of
institutional theory in a methodologically applicative manner. My most prominent form of support was how I found that legitimacy appeared to take precedence over sound practice for several institutions. This was apparent when institutions reported high accessibility rates to a low standard rather than average accessibility rates to a high standard.

In addition, my research further supports institutional theory’s top-down constraint concept in so much that once a standard was chosen at the institutional level, every layer below did the same. Those institutions with high standards had subordinates work to a higher standard. Alternatively, subordinates with imposed lower standards abided by them. With this in mind, I would encourage others to further the application and development of institutional theory with future research for it offers insights and social explanations as to why institutions act as they do.

Research

Prior to my study, the research in the area of accessible website design was limited. I did not find any studies that combined policy and practice in both a quantitative and qualitative manner. I also incorporated a more advanced accessibility assessment reporting value that had not been previously used in web accessibility studies.
So, what I have done is open up a new line of research that not only examines how accessible website design policies affect practices, but also the why.

To further expand on the implications for research, previous researchers typically used a pass-fail rate for a page no matter how many accessibility errors existed on a particular page. Realistically, this representation is too binary. For example, if a page had developed and deployed 99 elements perfectly and missed one issue, that page should be considered 99% accessible rather than being labeled as a page that completely fails (Chilson, 2002; Flowers, Bray & Algozzine, 2001; Gutierrez and Long, 2001; McCullough-Stein, 2002; & Williamson, 2005). For this reason, researchers should move away from this dichotomous representation and expand their assessment practices so as to incorporate a more thorough approach.

For example, when Williamson (2005) found that 65% of Division 1 schools were not in compliance or McCullough-Stein (2002) found that 81% of the NCATE Pacific region schools had failed or even when Flowers, Bray and Algozzine (1999) found a 77.1% fail rate, their scales were based on a pass-fail binary option. If the pages that they assessed only had one or two accessibility issues, then their rates would most likely look much less drastic. The implication
is the improvement of face validity in accessible website design research due to a more in-depth representation of the data.

**Future Research**

During my study, I discovered some very interesting results and by doing so, I was afforded the opportunity to foresee opportunities for more research in the areas of accessible website design assessments and implementations. In four areas in particular more research is needed: policy choice, assessment models, design knowledge, and institutional commitments.

The first area of research ripe for exploration is to find out more about policy choice through a research question such as: When postsecondary institutions are offered choices for an accessibility policy, why is one chosen over another and which entity makes that decision? This might best be answered in a qualitative fashion, especially through interviews with the administrators in charge of making such decisions. With a better understanding of policy choice, future policies could be articulated and designed so as to better achieve intended outcomes.

A second area of research would be a quantitative analysis of evaluation methodologies promoted in research.
All of the studies I reviewed instituted a pass-fail model that does not appropriately represent levels of accessibility. Through a research question such as:

Would previous research that found statistical significance using a pass-fail model maintain the same level of significance with a functional assessment?

it would be possible to ascertain how well previous studies have represented the accessibility of web pages. Furthermore, results could influence the evaluation process in future practice, policy and research.

A third research topic would be to uncover the accessible website design knowledge base of those designing and reporting on websites. This mixed methods research should explore how the practice of accessible website design is administratively aligned in an institution, how much those individuals know about accessibility, and who is doing it best and why. By understanding these areas, exemplar programs and individuals can be identified which can be used as resources in order to create even more successful accessibility models.

A final area of important future research would be to examine the correlation between institutional support for the integration of accessible website design practices and the accessibility of deployed websites. With a mixed
methods approach, it would be possible to discover whether or not an integrated method works better than an isolated one. More specifically, does an institution that has one office in charge of fixing inaccessible websites fare better than an institution that trains all web developers on the creation of accessible websites? Understanding and implementing the best method could have a positive impact on the accessibility of institutional websites.

**Final Reflections**

Reflecting back on this research as a whole, I have realized that my experience was an incredible learning opportunity that advanced me academically, professionally, and personally. If I had the opportunity to do it all over, I would use my knowledge gained and lessons learned to repeat some things in the exact same fashion and improve upon others.

Through my research, I have come to realize the importance of the interplay between quantitative and qualitative data and how statistics alone might fall short of representing the whole picture of a phenomenon. I better understand this concept because while I was able to identify issues with my quantitative data, I relied on my theoretical lens and my qualitative data to understand the social implications. In a sense, I wish I could have
collected more qualitative data during the year that I studied website accessibility changes. In doing so, I would have gained a deeper understanding as to why institutions responded as they did to IBHE’s requirements. As a professional in this field, I better realize that the success of a policy is not solely reliant on supportive statistics.

I was also surprised to find out that institutions will choose presence over practice in pursuit of legitimacy as framed by institutional theory. Perhaps the institutions I studied were doing the best they could with the resources available to them, perhaps not. Whatever the reason, I will need to keep in mind the possibility of such actions as I interact with the interpretation and application of policies on a local level, as well as when I study institutional rules and requirements in a larger sense.

By way of closing, the intent of my research was to investigate and inform on the affect of accessibility policy on practice. While my investigation is complete, I take with me the opportunity to inform.
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University of Illinois at Urbana/Champaign Campus


APPENDIX A

Data collection dates and linked homepages

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3. Governors State University
   - http://www.govst.edu/

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4. Illinois State University
   - http://www.ilstu.edu/

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5. Northeastern Illinois University

- [http://www.neiu.edu](http://www.neiu.edu)

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6. Northern Illinois University

- [/http://www.niu.edu](http://www.niu.edu)

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7. Southern Illinois University Carbondale

- http://www.siuc.edu/

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8. Southern Illinois University Edwardsville

- http://www.siue.edu/

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9. University of Illinois Chicago

- http://www.uic.edu/

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10. University of Illinois Springfield

- http://www.uis.edu/

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11. University of Illinois Urbana/Champaign

- http://www.uiuc.edu/

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12. Western Illinois University

a. http://www.wiu.edu/

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**Accessibility checkpoints example: SIUC January 2006**

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VITA

Graduate School
Southern Illinois University

Michael P. Whitney

7708 Hammond Drive, Charlotte, North Carolina 28215

Whitny23@gmail.com

Southern Illinois University Carbondale
Master of Science, Rehabilitation Administration and Services, May 1999

Southern Illinois University Carbondale
Bachelor of Science, Aviation Management, May 1993

Southern Illinois University Carbondale
Associate in Applied Science, Aviation Maintenance Technology, May 1992

Dissertation Title:
The Relationship Between Web Accessibility Policy and Practice in Postsecondary Institutions

Major Professor: Dr. Kathy Hytten

Publications:


**Grant Awards:**

**Principal Investigator, Co-Author**


**Project Director, Fiscal Officer, Author**

$16,500 (FY07) - Illinois Board of Higher Education Innovation Grants: Higher Education Cooperation Act titled Technology: Supporting Students through Accessible Media

**Associated Project Staff, Co-Author**

$595 (FY07) - Southern Illinois University Student Affairs 6th Annual Innovation Awards Competition Grant titled Distance Interpreting

**Associated Project Staff, Co-Author**

$19,400 (FY07) - Internal Grant from the Southern Illinois University Student Technology Fee Committee

**Principal Investigator, Co-Author**

$55,800 (FY06) - Illinois Board of Higher Education, Higher Education Cooperation Act Short Term Experimental Education Grant titled Access through Adaptive Computer Technology and Website Design

**Principal Investigator, Co-Author**

$60,000 (FY05) - Illinois Board of Higher Education, Higher Education Cooperation Act Long Term Education Grant titled Adaptive Computer Technology and Website Design
Principal Investigator, Author
$2,108 (FY04) – Southern Illinois University Student Affairs 4th Annual Innovation Awards Competition Grant titled Access through Technology

Principal Investigator, Co-Author
$74,000 (FY04) – Illinois Board of Higher Education, Higher Education Cooperation Act Long Term Education Grant titled Adaptive Computer Technology and Website Design

Associated Project Staff, Co-Author
$55,000 (FY03) – Illinois Board of Higher Education, Higher Education Cooperation Act Short Term Experimental Education Grant titled Access Through Adaptive Computer Technology and Website Design

Associated Project Staff, Co-Author
$16,000 (FY03) – Internal Grant from the Southern Illinois University Student Technology Fee Committee

Associated Project Staff, Co-Author
$55,000 (FY02) – Internal Grant from the Southern Illinois University Student Technology Fee Committee