Web Technology is a Strategic Tool for Administrators in Higher Education to Increase Students Retention

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ABSTRACT

Student retention has become a challenging problem for most of the academic institutions and it becomes more challenging with the increased use of Internet to convey information, deliver instructional materials, and make online instruction modality more interactive in educational environment. Even though the technologies for establishing a new digital educational environment to assisting students of all abilities including those with special needs are improving and are becoming more available and affordable at a rapid pace. These improvements and media choices can provide substantial benefits for not only students with special needs; but for the general student population with learning styles and modalities. The dynamic nature of the technology presents a good opportunity to administrators of the higher education institutes to increase student retention by providing the best tools available including accessible websites to their students. This paper presents result of examined websites of one hundred universities providing higher education. The study investigated the accessibility level of the websites according to W3C standard guidelines. The paper also provides recommendations, based on this research finding, on how student retention could be increased by making institutions' website accessible.

INTRODUCTION

Enrollments in higher education institutions have steadily increased due to utilizing different teaching modalities (on-line, hybrid, face-to-face), in particular with the increasing of delivering courses by leveraging the Internet. Many researchers have been confirming the fact of increasing the enrollments in higher education institutes as well as increasing the number of students who do not complete their degrees. (Swail, 2004). Therefore, even though there is increasing in the enrolments, still there is a major problem in keeping students till they finish their degrees. The phoneme of increasing students who do not finish their degree results in twofold. One is the nonpositive impact on the institutes' strategic planning due to a greater financial loss, high cost of recruiting new students, a lower rate of graduation, etc. and the other is the affect on the image of the institute from the students and their parents view (Beckett & McComb, 2004).

Retain students has become a determining factor in resolving a major problem for higher education institutes, Therefore, the administrators of higher education institutes should identify and implement an effective program in order to increase the retention of qualified students. The program should consider several factors including institutes and personal factors. Examples of institutes' factors are academic programs quality, technical issues, instructions modalities, and institutional social factors. Examples of personal factors are geographical area, age, gender, abilities, and academic skills. The program should provide students with a meaningful learning environment, so that students will become connected to the institution by developing a sense of belonging within the student body. Furthermore, the program should result in a higher student retention rate (Hill, 2007).

With the increased use of website to convey information, deliver instructional materials, and make online instructions modality more interactive in educational environment and the increased number of students with special needs, it becomes more vital to ensure that all students have equal access to institutes information and the instructional materials it provides.

Most of Web contents including instructional materials are not available in formats that are accessible to all students in particular for those students with special needs.

Inaccessible contents can stigmatize learner with special needs by preventing them from learning along with their peers, thereby limiting their educational opportunities (Franklin & Harmelen, 2007). Therefore, as the Web becomes the main open door for institutes to present their services and instructional materials (Klein, et al., 2003), students with special needs face even more challenges in getting the appropriate information in a time manner and keeping pace with their peer.

Developing accessible website means ensuring that its contents and functionality are easily available and usable to the widest range of people, including those with special needs. Therefore, accessibility, in this context, enables people of all abilities to realize their full potential (Thompson, & et al., 2006).

The rest of the paper is organized into three sections. Section 2 presents the impact of Web technology on students' retention and the importance of Web accessibility in higher education. Section 3 presents the data analysis and the study findings. Section 4 concludes the paper with recommendations and future research.

WEB TECHNOLOGY AND STUDENTS RETENTION

Nowadays, with the great exponential growth of online teaching modality in most of higher educational institutes, many studies indicate that the students' retention become more challenging. Even though there are some institutes who implementing the hybrid teaching modality and other institutes who still only offer traditional teaching (face-to–face) modality, but they provide all their services and instructional materials via the Internet.

The variation of teaching modalities, by leveraging the Internet and other various technologies, has allowed a much broader and diverse population to enroll and pursue degrees in higher education. As educators we believe that web accessibility is one significant mechanism that can be deployed by institutes to support their approach for increasing qualified students retention.

Hardware and software accessibility has been mandated by section 508 of the Rehabilitation Act amended in 1998 and enacted in June of 2001. Beyond legal requirements, ensuring that systems are accessible to all users is a concern shared by all socially responsible developers (Rosmaita, et al. 2006). According to a study conducted by McNeil, one in five Americans has a disability and one in ten has a severe disability (McNeil, 2010). The researchers in Microsoft Forrester Research, Inc reported that 57% of computer users are probable to benefit from the use of accessible technology.

The Importance of Web Accessibility in Higher Education

A university's web home page is perhaps the most important part of their site. It is the first page students will access, and the page that will lead to every other page and/or element on the site. It should be accessible to all people regardless their abilities. Students with special needs will especially benefit from the use of the web site. They should be allowed to access key pages including but not limited to Admission, Disabled Student Services, Library, Financial Aid, Bookstore, Colleges, Departments, and Instructors websites (Franklin & Harmelen, 2007).

The homepage is where students will first come to gather information about the institute, so it will benefit the institute to have an attractive page that will entice individuals seeking higher education. Hawke (2004) says Universities should provide users with "equal access" whether or not they are on campus. Institutes homepage paints an overall picture of the university, and if it is inaccessible then they will have less diversity and their reputation will suffer. The homepage is also where prospective high school and transfer students look to gain knowledge about a potential university. Important news and events are also listed on the home page in addition to campus email, admission and other student services. If the home page of an institute is not accessible, a wide range of people especially those with special needs will have difficult time finding specific web pages. Furthermore, if an institute homepage is inaccessible, that will render all other pages on the site such pages that displays grades, athletic information, and career placement information and campus layout unreachable as well.

One hundred universities' website were tested and evaluated for their accessibility rate, only a single university had its homepage come up error free. With the exception of one, they all had some types of error whether it was priority one (which is required by law for all public universities to satisfy), priority two, or priority three (Wonnacott, 2006). The results indicated that the tested websites are not complying with accessibility standard guidelines and it must be redesigned and improved their accessibility rate.

All students body in particular those with special needs would require access to information regarding the services provided by an institute. An institute has to accommodate them. Besides being a federal requirement, it would be in an institute best interest financially to make accommodations for the broadest range of people. For example, the visually impaired should have information about Braille signs, specialized keyboards that the school has, and other accommodating tools that are available presented to them in an audible format. For visual material on a Disability

Services Webpage such as graphs, or maps, an audio version should be made available. If an audio version cannot be produced, a user should be informed of an alternative way of reaching the information (Klein et al., 2003).

In addition to the homepages for the offices/departments mentioned above, it is imperative that the library in a higher education institute to have an accessible website. The library homepage should not only inform users of the methods of obtaining the available data and resources on the campus physical site, but also it should furnish users with reliable and usable methods of accessing the available data and resources via the Web as well.

Many courses today involve research activities. While students may have gone physically to libraries in the past, there are digital libraries available today. These libraries may help all type of students especially students with special needs regardless of teaching modalities are implemented in their institute. Therefore, accessing research material digitally is essential to facilitate students' education (Raue &Lewis, 2011). Although most higher education institutions have library web pages, our study indicates that most of them do not comply with web accessibility standards, as required by law. Of the one hundred institutes in our study, not a single university had a library web page without any errors. This means that one or more type of special needs students will have difficulty doing research, accessing material, distant learning over the web, or using their university's online library.

For example, online libraries give the mobility impaired the opportunity to stay in a single location for their research assignments. Doing so would cut down on specialized transportation, unnecessary equipment and risks. Visually impaired users would also gain advantages from access to online libraries from their own environment. This would be extremely convenient for them, as screen readers may or may not be located at the library's physical location. Users that are completely blind would not need to be worry about transportation to or from an online library.

For users who do not speak the primary language, online access would not only benefit them, but the university as well. Specialized language translation software can be used to interpret text from one language to another. Users would not need translators, and universities would not need multiple copies of the same materials in different languages. The speech impaired would benefit from online resources, because most web pages are designed to be navigated using a keyboard and/or a mouse (Goette & et al, 2006).

Hawke (2004) writes, "A mental impairment encompasses any mental or psychological disorder". People affected by mental disorders such as depression, attention deficit disorder, or social anxiety disorder will benefit from libraries on the web because they can access it from a familiar environment, therefore reducing any anxiety that would occur if they had to physically be out at the location. For example, someone with a social anxiety disorder may find it difficult to focus on learning when unfamiliar people are present. Or perhaps a student with attention deficit disorder may find it hard too. Students with hearing disabilities would benefit from online resources in a very similar fashion. For example, if the student is assigned to review certain material for a particular course that involves narration, music or other audio form, speech recognition software may be installed so a text version can be available for the student, very similar to the closed captioning on modern televisions (Raue & Lewis, 2011).

Even though many learning resources are available at online libraries, there is often a need to purchase other physical learning materials as well. Campuses usually have bookstores available for students to purchase textbooks, supplies, and other needed materials. Bookstores, as well as the libraries, have web pages designed to serve students including purchasing books and supplies. In our study, only a single school had an acceptable bookstore page across all three priorities. The rest had one or more errors. Again this means that one or more type of special needs students will not be able to utilize the bookstore resources. For example the mobility impaired are adversely affected by the lack of accessibility since they are forced to either look elsewhere to find the needed course materials, or to travel to the physical location to make the purchase. The vision impaired faces a similar burden. Possibly requiring a Seeing Eye dog or human guide, the visually impaired may need some type of assistive device to transport them in person to the location (Klein, et al., 2003). If they choose to look online instead of taking the physical path, they will need to find yet another website that complies with Web Accessibility guidelines, and it is compatible with screen reader, or other type of assistive software the user may have.

DATA ANALYSIS AND RESULTS

This paper presents results of investigating the accessibility compliance rate of one hundred universities website. The purpose of the study is to determine how accessible the university top pages in their websites and its impact on students' retention. The study done by using a tool called Test Accesibilidad Web (TAW). The TAW software scans a webpage to evaluate its compliance rate with the guidelines web accessibility standards (WebXac, 2006).

This study concerns mainly with Web Content Accessibility Guidelines (WCAG). WCAG were developed by Web Content Accessibility Guidelines Working Group (WCAG WG) and became a W3C recommendation on May 5, 1999. They explain how to make accessible Web sites (W3C, W3C_a, & W3C_b, 2006). There are three priority levels of normative checkpoints. Priority 1 has 17 high-priority checkpoints, Priority 2 has 33 medium-priority checkpoints, and Priority 3 has 16 lower-priority checkpoints. WCAG detailed standards can be found at http://www.w3.org/TR/WAI-WEBCONTENT/full-checklist.htm . Web Accessibility Initiative (WAI) has further defined three levels of conformance. Conformance Level A means all Priority 1 checkpoints are satisfied, Conformance Level AA means all Priority 1 and 2 checkpoints are satisfied, and Conformance Level AAA means all Priority 1, 2, and 3 checkpoints are satisfied (WebAim, 2006).

The study findings in the paper represent the result of scanning 100 universities' websites including homepages for the University, Library, Bookstore, Instructors, Financial Aid, Admission, and Disabled Student Services office of each university. The software checked various elements, for example, the "ALT" tag, which web designers add to images, is used to aid screen readers in describing a picture for the visually impaired (Klein et al., 2003). TAW incorporates a visual aspect when reviewing web pages for accessibility issues which make it easier to distinguish different type of errors. For example, depending on whether they are warnings or errors, they are either red or orange question marks. A screenshot is provided below.
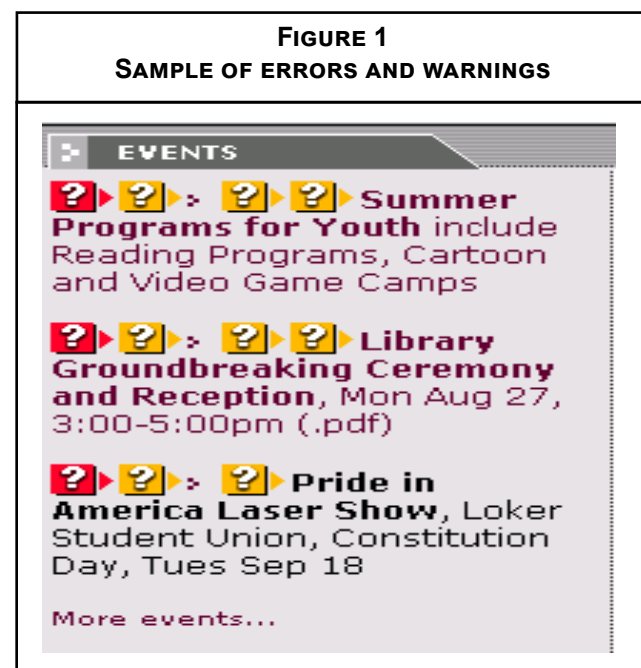
The TAW software would scan a page, and would report the number of errors in three priorities, #1 being the highest and most important to Web Accessibility. The TAW software would then indicate the amount of manual checkpoints, or "warnings" that applied to the page in

TABLE 1
DESCRIPTIVE STATISTICS FOR THE PRIORITY/TESTED PAGE FOR THE 100 UNIVERSITY

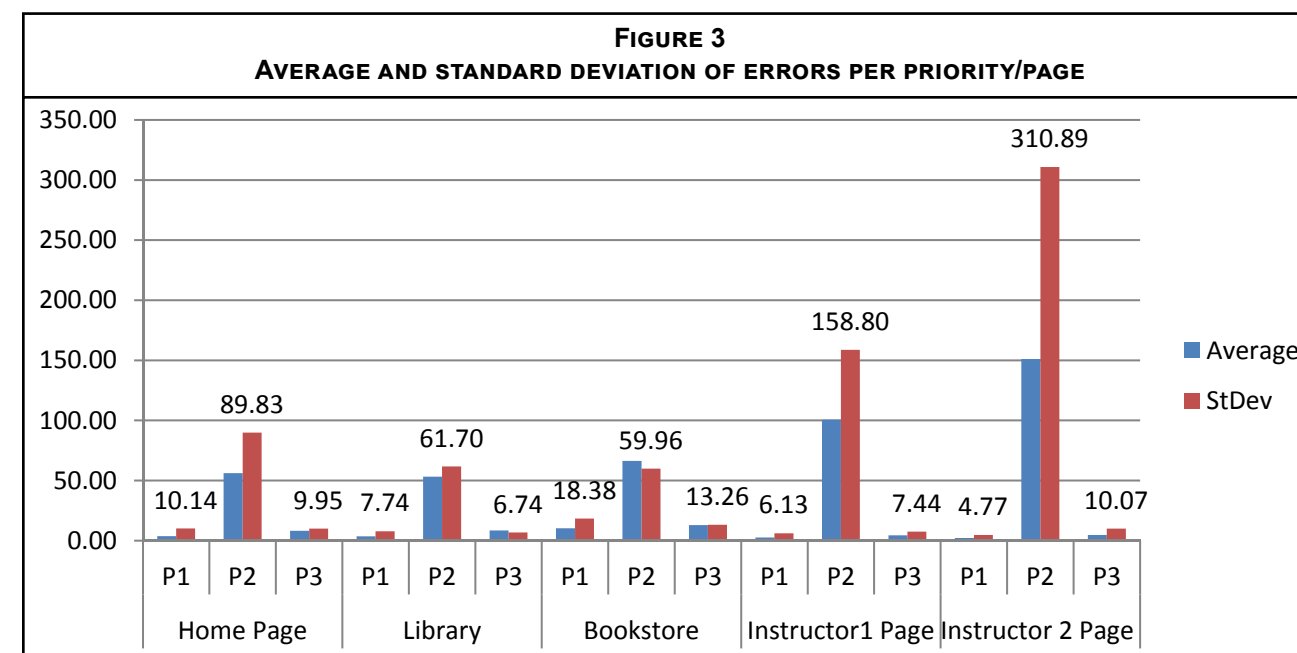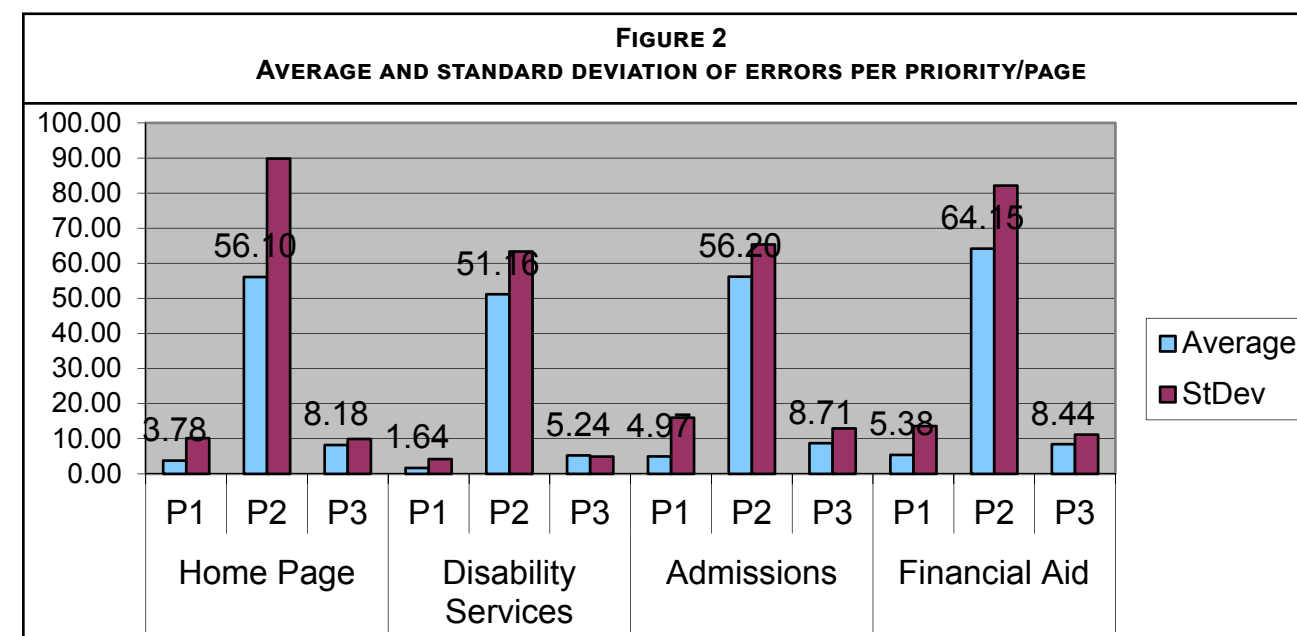| Website's Top Page	Priority	Average	Stdev	Max
		Number of errors		
University Homepage	P1	3.78	10.14	75
	P2	56.10	89.83	713
	P3	8.18	9.95	48
Disability Services	P1	1.64	4.18	28
	P2	51.16	63.38	359
	P3	5.24	4.92	20
Admission	P1	4.97	15.97	151
	P2	56.20	65.38	397
	P3	8.71	12.92	93
Financial Aid	P1	5.38	13.61	106
	P2	64.15	82.15	379
	P3	8.44	11.17	67

TABLE 2
DESCRIPTIVE STATISTICS FOR THE PRIORITY/TESTED PAGE FOR THE 100 UNIVERSITY

Website's Top Page	Priority	Average	Stdev	Max
		Number of errors		
University Homepage	P1	3.78	10.14	75
	P2	56.10	89.83	713
	P3	8.18	9.95	48
Library	P1	3.54	7.74	50
	P2	53.20	61.70	322
	P3	8.50	6.74	28
Bookstore	P1	10.28	10.28	10.28
	P2	66.30	66.30	66.30
	P3	12.90	12.90	12.90
Instructor1	P1	2.64	2.64	2.64
	P2	100.63	100.63	100.63
	P3	4.36	4.36	4.36
Instructor2	P1	2.15	2.15	2.15
	P2	151.04	151.04	151.04
	P3	4.75	4.75	4.75

FIGURE 1
SAMPLE OF ERRORS AND WARNINGS

testing. Warnings are issues the software thinks could be potential problems based on elements that are included in the page, and should be manually reviewed and checked by a person. Much like the errors, the warnings would be categorized in 3 priorities with 1 being the most important and 3 being the least. Priorities are assigned depending on its "impact on accessibility" (W3C, 1999).

The importance of having accessible websites for the Admission, Financial Aid, and Disability Services offices is addressed in (Eyadat, and Lew, 2011).

Table3 and figure2 show, when comparing the different pages in number of errors for the three priorities we found that Priority 1, Instructor2 home page has the least number of errors with average 2.15, and therefore it was the most accessible. On the other side, the Bookstore homepage has the highest number of errors with average 10.28 and was considered the least accessible. Priority2, Library home page has the least number of errors with average 53.26, while the Instructor2 homepage has the highest number of errors with average 151.04. Priority 3, Instructor1 homepage has the least number of errors with average 4.36, and therefore was the most accessible. Where,

FIGURE 2
AVERAGE AND STANDARD DEVIATION OF ERRORS PER PRIORITY/PAGE

FIGURE 3
AVERAGE AND STANDARD DEVIATION OF ERRORS PER PRIORITY/PAGE

the Bookstore homepage has the highest number of errors with average 12.90.

Summary statistics indicates that the number of errors instances for priorities 1, 2, and 3 are large as shown in Table 2. Even though few campuses are in compliance with priority 1, but due to the number of error instances combining the three priorities, there are a large number of individuals who will not be able to access certain information from the tested top pages. This could be a critical factor causing students to drop their study program or leading them to look for other alternative.

CONCLUSION AND FUTURE RESEARCH

This paper focused in determining the impact of web accessibility on students' retention. It investigated the compliance rate of one hundred universities' websites to the web accessibility standard WAI guidelines. Findings indicate that the majority of the universities' top Web pages are not comply to the WAI guidelines at some point. This indicates that there is a large number of individuals who will not be able to access certain information from their top Web pages due these error instances.

Therefore; according to our findings along with other statistical data on the internet and government laws which are related to people with special needs, accessible website became a critical part of the core components of an institute. We believe strongly that administrators in higher education should consider the website accessibility issue as a core component of any effective approach to increase qualified students retention. Therefore, implementing an effective approach along with web accessibility will increase enrollment, improve the service and enable people of all abilities to realize their full potential, and improve effectiveness and efficiency in delivering the information and instructional material by leveraging the Internet. Overall accessibility benefits everyone includes all students with various learning styles and it will increase students engagement, strength students ability, and build an interactive learning environment.

The limitation of this research is that the tested pages were limited to small number of home pages for each university. We intend to increase the number of the tested pages and re-examined 31 universities' website out of the 100 universities. The 31 universities those who integrated web accessibility features with their websites in order to show the impact of the web accessibility on students' retention.

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