

Improving Web Accessibility Through Service-Learning Partnerships

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Abstract

This paper describes a service-learning project in a graduate web usability class at Towson University. The focus of the service-learning project is on helping non-profit organizations in the Baltimore-Washington area make their web sites more accessible for people with disabilities, while providing real-world experiences for students. This paper provides a background on web accessibility, the methods used to implement service learning, and the outcomes. This project had a positive impact on both the students, who were able to apply their skills in the community, as well as the non-profit organizations, who were able to gain insights on how to make their web sites more accessible.

Keywords: usability, accessibility, service learning, community partnership, human-computer interaction, assistive technology, group projects

1. INTRODUCTION

A topic of increasing importance is the accessibility of information systems for users with disabilities (Alliance for Technology Access, 2000). With appropriate planning, information systems can be designed so that they can be used by people with various disabilities. People with disabilities may use a number of different types of assistive technology, which are alternative input and output devices. For instance, someone with visual impairment might use a screen reader, which will produce computer-synthesized speech output to match all text on the screen, or a Braille printer, which will print any textual output in Braille (Paciello, 2000).

Accessibility is not just a theoretical concept. There are a number of tools and guidelines to assist those that want to make their interfaces accessible. For instance, the World Wide Web Consortium has a set of guidelines

for web accessibility, known as the Web Content Accessibility Guidelines (WCAG). These guidelines (available at <http://www.w3.org/wai>) provide specific advice related to making web sites accessible. For instance, an important guideline is to "Ensure that all information conveyed with color is also available without color, for example from context or markup." These guidelines are split into three priority levels—priority level one are the guidelines that are most crucial, while priority level three are guidelines that are nice, but not necessary. The U.S. Government has a set of guidelines related to web accessibility, and these guidelines (available at: <http://www.section508.gov>) are very similar to the Web Content Accessibility Guidelines, Priority Level 1. In addition, there are software tools, such as In-Focus, A-Prompt, and RAMP that can examine web interfaces to find (and in some cases fix) most of the accessibility problems. Despite the availability

of the tools and guidelines, most web sites have not been designed for accessibility, and have a number of problems related to accessibility. This paper presents a service-learning project implemented in a graduate course, to help students learn and apply the concepts of web accessibility while helping non-profit organizations improve their web site accessibility.

2. CURRENT LEVELS OF WEB ACCESSIBILITY

There is a great deal of information available on the web, unfortunately, not all users can benefit from the information, since it is inaccessible to many users. Most studies show that a large portion of web sites are still inaccessible. All categories of web sites, including e-commerce (Sullivan & Matson, 2000), for-profit and non-profit (Lazar, Beere, Greenidge, & Nagappa, 2003), and even government web sites (Stowers, 2002) continue to be largely inaccessible. This is troubling, since many governments have stated that web accessibility is a priority, and now require that government information on the web be accessible to anyone using an assistive technology. For instance, the U.S. Government's Section 508 rules, in effect since mid-2001, require that all government web sites be accessible <http://www.section508.gov>. Other countries, such as Canada, England, and Portugal, have similar rules (Slatin & Rush, 2003). These rules generally do not apply to private web sites, although there have been some efforts to force companies to make their web sites accessible. In addition, it is generally acknowledged that while there is an up-front cost involved with making your web site accessible, at the same time, it can increase revenues and be a cost-justified expense (Slatin & Rush, 2003).

There are many non-profit organizations that are in need of assistance with their information systems needs. Generally, these organizations have small technology budgets, so data can sometimes be out-of-date and upgrades do not happen when they are needed (Lazar & Norcio, 2000). While many non-profit organizations might be interested in making their web site accessible, it is questionable whether they have the personnel and the budget to make it happen.

3. THE CLASS

A graduate class on "Usability Testing and Evaluation Methods" is offered during the Spring semester as a part of the M.S. In Applied Information Technology degree program at Towson University. The class covers web usability, usability engineering methods, web accessibility, and assistive technology. In the past, the class has used a partnership with a governmental agency to help improve the usability of the governmental web site, but has not addressed the topic of web accessibility (Lazar, Murphy, & O'Connell, 2003). It is important to note that currently, the topic of accessibility is not considered a "core" part of the curriculum for most information systems, and is not included in any of the national standard IS/IT curricula (Lazar, 2002). It was decided that the Spring 2003 class would include a service-learning partnership to help non-profit organizations improve their web site accessibility. Service-learning is increasingly a component of many IS programs, where students go and perform real-world projects, while helping local community organizations with their technology needs. Community partnerships, including service-learning experiences, are increasingly being used in computing courses, to help bridge the gap between theory and practice, and to help bridge the digital divide (Lazar & Lidtke, 2002). In the service-learning paradigm, students work on community-based projects that relate to and build on the course material, and at the same time, fill an actual community need. Service-learning has been used successfully in courses such as web design (Lazar, 2000), computer networking (Ruppel & Ruppel, 2002), database design (Jimenez, 1995), and software engineering (Sanderson & Vollmar, 2000). By doing a service-learning project, students get the experience of working in real-world situations, with real-world challenges, and in teams, which mirrors the workplace setting (Gasen & Preece, 1996). In addition, instead of working on a theoretical project which no one uses, the service-learning project is useful to an outside audience, which can help motivate students to do better quality work (Cohen & Riel, 1989; Shneiderman, 1998). Finally, service-learning projects largely eliminate cheating, since it is impossible for students to turn in previously submitted work, since that previous work would not

match the current assignment (Lazar & Lidtke, 2002).

4. THE PARTNERSHIPS

It is generally accepted that when creating service-learning partnerships, some students will want to choose their own projects, while other students will want to have partnerships setup for them (Jacoby, 1996). This can be due to a number of factors. Some students might be from the local area, while others might not be from that area. Some students might already be involved in the local community, while others are not. Some students can be shy about approaching people in the community, while others are not. Therefore, it is generally useful to have some possible community partners in place, while also allowing students to work with community groups with which they already have a prior relationship. Working with the community service office at Towson University, two community groups expressed interest in making their web sites accessible. These two community groups sent information about their respective organizations and their web sites. These potential partnerships were then available to students who did not have community partners in mind.

5. THE PROJECT

The project took the form of a consulting report. The consulting report seems to be the best way to implement the service-learning project, due to a number of factors. Unfortunately, it is not realistic to require that students actually fix the web site accessibility flaws as a part of the course requirements. For most of the students, they would have the technical knowledge to be able to make the fixes. However, to make the fixes, the community partners would need to give the students password access to their web sites and web servers, something that they are not very willing to do. While it would be theoretically possible to setup a confidentiality agreement between the students and the non-profit organization, this in fact rarely can happen due to political situations. That is, many system managers or webmasters are leery of providing outsiders with access to their systems, especially with all of the viruses circling around the Internet today. In addition, if students fix the accessibility flaws, without requiring the

non-profit organization to get deeply involved, then it is likely that those flaws would re-appear in later versions of the web site. By advising the community partner on how to fix the flaws, but requiring the community partner to actually do so, this ensures that the community partner will become aware of the various accessibility flaws, and will hopefully not make the same mistakes again. To paraphrase from the old saying about fish, "Give a person an accessible web site, and their web site will be accessible today. Teach a person to make an accessible web site, and their web site will be accessible for a lifetime."

After meeting with the community partner and learning more about the history, development, and maintenance of the web site, students examined the respective websites, using a number of tools and guidelines. A computer at Towson University, with a number of software tools, was made available to the students. These tools included A-Prompt and InFocus (two software tools that test web sites and point out accessibility flaws), as well as IBM Home Page Reader (a screen reader limited to web browsing, which will read all text on the web page and produce computer-synthesized speech). In addition, students had received paper copies of the Web Content Accessibility Guidelines, and the Section 508 web accessibility guidelines.

Four student groups chose their own community partner, while one group chose a community partner that the professor had arranged. The five projects were:

- A Catholic high school in suburban Baltimore
- A Catholic elementary school in Baltimore City
- A private K-12 school in Baltimore City.
- A homeowners association in a Baltimore City neighborhood
- A volunteer group affiliated with the Peace Corps

Student groups organized their consulting reports using guidelines provided by the professor. The students presented a list of the accessibility flaws, as well as suggested fixes, estimated time per fix, and a prioritized list of the most serious accessibility flaws. From a practical point of view, the knowledge about accessibility flaws is not

useful to the non-profit organizations if it is overwhelming and unattainable. This information is much more useful to non-profit organizations when it is prioritized, with examples presented, as well as estimates on how long the fixes will take. For instance, one web site had included an alternative text for each of the thirty graphics on a web page. However, the alternative text was the same for all thirty graphics (e.g. "summer program"), and did not in reality describe any of the graphics. This is relatively easy to fix, as alternative text should be added to all of the graphics, but that alternative text should actually identify each individual graphic (e.g. "summer schedule," "summer fees," "summer instructors"). On another site, the site only had a few minor accessibility flaws—for instance, the frames on the web page did not include meaningful frame labels, which would make it impossible for someone using a screen reader to browse the web site. To solve this, labels that accurately describe the frame (e.g. "navigation," "search box," or "main content") should replace meaningless frame labels (e.g. "top," "bottom," or "grp"). However, these are not impossible fixes to make, and these fixes wouldn't even take a long time to make. Another web site had multiple nested tables, which were very confusing to navigate when using a screen reader. This would take a much longer time to fix.

6. THE OUTCOMES

These consulting reports were presented to the respective community partners, with the hope that the community groups will use this knowledge to update their web sites to eliminate many of the accessibility flaws. The organizations already have some interest in the topic of accessibility. In addition, they have agreed to have their site examined for flaws, and they have provided information about their web site, including the development history and the management of the web site. The community partners were open to the suggestions on how to improve their web sites. At the same time, this does not necessarily mean that the accessibility improvements will be made in the web site. Students were encouraged by the professor to continue working with the organization to help them make their web sites more accessible. Some students indicated that they would do so. As a part of evaluating the

course project, six months after the projects were completed, the web sites will be examined again to determine if the organizations had followed through. The hope is that by implementing the service-learning project, students were able to gain valuable experience by applying their knowledge in a real-world setting, and at the same time, help local non-profit organizations make their sites more accessible, which in the end will help bridge the digital divide by allowing more people to benefit from the information available on the web.

7. SUMMARY

This paper presented a service-learning project that was implemented in a graduate class on web usability. Students were able to apply their skills in making web sites accessible, and the community was made more aware of the topic of web accessibility. The hope is that this work will bring more attention to the topic of web accessibility, and encourage others to incorporate similar service-learning projects in their own classes.

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