

Evaluation of training for software developers on the social justice model of accessibility

Angie Brunk¹

Abstract:

While accessibility of web content and computer software is legally mandated by the United States, the European Union and most other nations, few studies have examined which approaches for training developers, and other key personnel involved in software development, are most effective in creating a culture that prioritizes accessibility in the development process. This paper examines the effectiveness of training that explicitly addresses the social justice model of disability and demonstrates the perspective of a user who is visually impaired. The training was provided for the developers, product managers, high-level executives and trainers for Springshare, a vendor that produces a cloud-based content management system aimed primarily at libraries. The effectiveness of the training was evaluated using pre and post training surveys and the transcript of the Zoom chat, which took place during the training.

Two models of disability and how they affect software product development:

At present there are two models of disability that are predominate within the context of computer and software development. The medical model views people with disabilities as problems to be fixed. The social justice model, in contrast, seeks to alter obstacles that are part of structures or systems. (Gaskin. 2015) Paul Longmore historian and advocate for people with disabilities summarized the differences between the two models, “Previously, disability was defined as a set of limitations in the abilities of people with disabilities to function in society because of some pathology in us. The disability rights movement redefined disability as a problem mainly out there in society—not just in our bodies and minds but in society.” (Shapiro 2010)

Within the context of human-computer interaction, the medical model is analogous to treating issues of accessibility as a checklist to be applied towards the end of the design and development process. The social justice model is, in the same context analogous to universal design or considering accessibility from the beginning of the development process. There is no technical reason to create software that is not designed to be accessible. It is neither more difficult nor more costly to produce software that is designed to be accessible. At least one study of website design found higher user satisfaction and better task performance among both visually impaired and non-visually

Angie Brunk Missouri Western State University abrunk@missouriwestern.edu

impaired users when websites conformed to WCAG standards at the AA level versus non-conforming websites. (Schmutz et al. 2017) However, inaccessible software is still produced. This is especially problematic for employment and education as student who must wait for content to be made accessible or employees who cannot use the same software as other employees are at a distinct disadvantage. (Lazar et al. 2015) If producing accessible software is neither more difficult nor more costly, then the obvious conclusion is that cultural barriers are the primary reason that inaccessible software is still produced. This paper is a preliminary examination of training strategies to effect cultural change to move computing and software development towards consciously adopting the social justice model in the design of software and web content.

The Organization:

The training was delivered via Zoom webinar by the author for, Springshare, a vendor who produces a cloud-based content management system, calendar and scheduling software, software for creating tutorials and surveys and statistical tools used primarily by libraries. At the time of the webinar, Springshare employed 35 people including developers, trainers, community (social media and blog content producers), sales and executive personnel. Springshare employees all work remotely. In the Zoom chat during the training, one of the participants noted that many libraries are using Springshare products to build web pages and are relying on them to provide information about building accessible content.

The Training:

The author delivered the webinar for executives, developers, trainers and community personnel. Questions were encouraged. Research suggests exercises designed to emulate low vision can cause people to underestimate the capabilities of people with visual impairment (Silverman et al. 2015), so such exercises were not suggested, and were discouraged by mentioning the adaptability of people with disabilities throughout the training. The author was born with a visual impairment, so her own experiences and frustrations were incorporated into the training. The following content was included in the training:

- the difference between the medical and social justice models of disability;
- trends in higher education in the U. S. of moving towards the social justice model of accessibility and the movement towards student self-accommodation when possible;
- information about the primary users of assistive technology and an overview of the technologies used;

- a brief overview of how people decide which technology to use for the task at hand and that user's needs change frequently;
- the importance of accessibility of the content-creation side of content management systems for the continued employability of people with disabilities; (Lazar et al. 2015)
- user walk through of an accessible website (<http://www.glaucoma.org>) pointing out features that made it particularly accessible;
- user walk through of a site that is not fully accessible (<http://www.kcmo.org>) with explanation of accessibility problems and problematic design elements;
- In the Zoom chat taking place during the training participants asked about the accessibility audit the author had recently completed for Springshare, so this information was added to the training.

Methodology:

Surveys were administered before and after the webinar using Survey Monkey. The survey was short to encourage completion. Because of the small sample size, additional demographic information was not collected. Content analysis was performed on the transcript of the Zoom chat that was taking place during the webinar and the answers from the pre-post survey that requested text answers. All surveys were completed anonymously.

Findings:

The data suggests the training had a positive impact on the developers self-reported knowledge of both their technical knowledge of accessibility and understanding of the needs of users with disabilities. What effect, if any, the training had on how developers prioritize accessibility within is less clear from the available data. Only descriptive statistics were used because of the small sample size and preliminary nature of the research. Nineteen participants completed the pre training survey and 15 completed the post-training survey. The responses to two items in the pre-training survey suggested that accessibility was already a high priority for Springshare. The survey data did not indicate a strong difference pre and post training to questions asking participants to prioritize accessibility in the software development process and to rate their technical knowledge of accessibility within the software development and web content creation processes. Prioritization of accessibility actually decreased slightly from from 4.68 to 4.44 on a scale of 1 to 5. Further research is needed to see if this decline would occur in a larger group or if this is an artifact of the lower completion of the post training survey. Participants rated their technical knowledge of accessibility on a scale of 1 to 5. The initial training plans were modified to include information about the accessibility audit of Springshare products (conducted by the author) due to comments on the pre-training

survey and questions raised on the Zoom chat during training. Participants were asked to rate the influence of learning about the social justice model of disability and the user walk through on their thinking about the needs of people with disabilities. Participants rated the user walk through as having more influence. Participants were asked “What part of the training did you find most valuable?” Seven of the 11 participants who responded described seeing examples of inaccessible content as the most valuable part of the training. Participants expressed an interest in learning more about assistive technology in the post-training survey.

	Pre-Survey	Post-Survey
Please rate the importance of accessibility in the software development process with one being low importance and 5 the highest importance.	4.68	4.44
How would you rate your current level of knowledge about the technical aspects of accessibility with 1 being novice and 5 being expert?	2.44	2.49
On a scale of 1 to 5 with 1 being little knowledge and 5 being expert, how would you rate your understanding of the needs of people with disabilities when using web pages and other similar content?	2.24	3.07

Conclusions, Limitations and Future Research:

Training that includes an overview of the medical and social justice models of disability and user walk through by people with disabilities appears to have a positive impact on software developers and trainers understanding of the needs of users with disabilities.

The research has significant limitations and should be regarded as a preliminary exploration of the training content and methodology. The conclusions are limited by the small sample size. The findings are self reported and it is not yet known whether they will produce lasting change in the software development process. The research is further limited by the climate in which Springshare operates. Its primary clients are educational institutions who are under legal pressure through United States Department of Education Office of Civil Rights and its international equivalents to ensure that publicly accessible content produced by the system conforms to WCAG standards. Therefore, the company already had a strong incentive to prioritize accessibility in the development process. Further, pre and post survey response indicated that accessibility was a high priority for Springshare.

Future directions for this research could examine the results of offering this training to broader audiences. Could a more dramatic change in culture be affected by offering the same training to an organization that did not consider accessibility a high priority? It would be especially interesting to see what effect training in the social justice model of disability and user walk-throughs by people with disabilities would have on undergraduate and graduate computer science or architecture students. This would be especially useful if follow-ups were conducted once students graduated and were out in the work force. Further research could also examine whether or not students and working professionals exhibit the same attitudes towards accessibility and whether or not different training content appeals more to working professionals or students.

References:

- Lazar J, Goldstein D, Taylor A. (2015) *Ensuring Digital Accessibility Through Process and Policy*. Morgan Kaufmann.
- Schmutz S, Andreas S, and Sauer J. (2017) "Implementing Recommendations from Web Accessibility Guidelines: A Comparative Study of Non-disabled Users and Users with Visual Impairments." *Human Factors*. 59(6) 956-972.
- Shapiro J. (2010) "Paul Longmore, Historian And Advocate For The Disabled, Dies." National Public Radio. August 10, 2010. Retrieved on September 14, 2016. <http://www.npr.org/sections/health-shots/2010/08/11/129127432/paul-longmore-historian-and-advocate-for-disabled-dies>
- Silverman A, Gwinn J, Van Boven L. (2015) "Stumbling in Their Shoes: Disability Simulations Reduce Judged Capabilities of Disabled People." *Social Psychological and Personality Science*. 6(4) 464-471.