

Evaluating the Usability of a Teacher-Created Website

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Abstract: Increased internet access to more and more families provides schools with yet another avenue for encouraging parents to be involved in their children's education. K-12 schools frequently use classroom websites to improve parent-teacher communication. Although there have been recent studies on teacher perspectives for teacher-created websites, designing websites to enhance learning, and "best" website design elements, few recent usability studies on teacher-created websites were found. This usability study attempted to determine the design and navigation effectiveness of a teacher-created Senior Project website. The study design was based on suggestions provided by Steve Krug's, *Rocket Surgery Made Easy* (2010). Parents of high schools students were the target audience for this study. The results of this usability study determined the Senior Project website's design and navigation to be effective for its intended purpose with most participants' comments and responses being positive and very complimentary. The results indicated that while effective website design can increase the effectiveness of users' information search behaviors, successful web searches are highly dependent on users' domain knowledge, their ability to recognize common website conventions and visual cues, to determine when to scan or read website content, and to avoid what Krug (2014) calls "satisfice" behavior.

Introduction

Previous studies found that parent involvement promotes higher academic achievement in students (Ferrara & Ferrara, 2005; LaRocque, Kleiman, & Darling, 2011). Consequently, K-12 schools have tried to provide parents with increased opportunities to be involved in their child's education. With Internet access becoming available to more and more families, it makes sense for schools to leverage the affordances provided by today's new communication technologies.

Although, some would not consider teacher-created websites a "new" communication technology, many K-12 school districts are increasingly using classroom websites to disseminate information to their constituents (Janicki & Chandler-Olcott, 2012). Lunts (2003) noted that even with the availability of text messaging, instant messaging, and social networks, parents still wanted to be able to check teacher websites to stay informed.

A number of studies on teacher-created websites focused on the impact of class websites on parent communication and student enthusiasm (Unal, 2008), or the visual elements and content frequently found on teacher websites (Tingen, Philbeck & Holcomb 2011), or teachers' perspectives on the use of class websites (Janicki & Chandler-Olcott, 2012). Dunn (2011), however, emphasized that a website's effectiveness should be measured by how well it achieved its intended purpose, not simply by its components. A cursory literature review found no recent studies on usability testing for K-12 classroom websites.

In March 2008, the Hawaii State Board of Education (BOE) established a BOE Recognition diploma for students who met a more rigorous curriculum that included completion of a Senior Project (Matayoshi, 2010). To accommodate for school level differences, Hawaii high schools were only provided with general guidelines describing the BOE's minimum requirements for Senior Project completion and left actual implementation to the individual schools.

A teacher-created website was developed to communicate Senior Project implementation at a Leeward high school on Oahu. The website's intended audience was the school's students (i.e., juniors and seniors), teachers, parents, and community members. In its first year of implementation, the website received positive feedback from teachers and staff on the information it provided. However, the website's usability was still undetermined. Thus, the purpose of this usability study was to examine the design and navigation effectiveness of a teacher-created website for parents of high school students.

Methodology

This usability study utilized a teacher-created website, developed by the researcher, using a free Weebly.com account. The website's design was based on Krug's *Billboard Design 101* suggestions (2014) which included using common website conventions, visual hierarchies, making obvious what is clickable, minimizing visual distractions, and formatting text to support scanning. The website's navigation menu options were limited to the templates provided by Weebly.com. Nevertheless, the website's design features were intended to support Internet users' information search behaviors.

Preparation/Pilot Study

Prior to the usability study, the researcher performed a series of tests using Camtasia and various audio recording microphones to identify which microphone would best meet the researcher's recording requirements. The laptop's omnidirectional microphone provided the best voice recording quality. These tests also allowed the researcher to practice using Camtasia's different recording settings to ensure optimal performance during actual usability interviews.

Before the first interview session, a pilot study was conducted with a member of the researcher's family, to test the interview process and to clarify search task directions. As a result, it was decided that a USB mouse would be made available for participants who may be uncomfortable using the laptop's trackpad. The pilot study also provided the

researcher with useful feedback that improved the website design before conducting the first interview.

Participants

Parents of high school students were the target audience for this usability study. The participants were recruited through personal acquaintances of the researcher to ensure they met the minimum target audience characteristics necessary to participate. Six adult participants were recruited for this usability study. Six out of six participants recruited completed all interview search tasks. All participants received a \$10.00 Jamba Juice gift card as compensation for their time. Each participant completed and signed a University of Hawaii Consent to Participate form and an Audio Recording Permission form before participating in this study.

Procedures

This usability study consisted of two iterative cycles, with three participants interviewed per cycle. Participants were asked to allow one hour for face-to-face usability interviews. The interviews were conducted in several locations that were convenient for the participants. Venues included the researcher's home and participants' homes and workplaces.

During usability test interviews, participants were asked to perform various information search tasks on the Senior Project website. The five representative tasks were based on common parent queries about Senior Project implementation at this Leeward high school. The five search tasks challenged participants to attempt the following:

1. Identify the four required Senior Project components
2. Locate Senior Project due dates
3. Identify who should be contacted to request a due date extension
4. Identify the qualifying criteria for a Project Advisor
5. Locate grading rubrics used to evaluate the four Senior Project components

Study participants were provided with identical instructions, read from a script, by the researcher. As participants worked to complete the five search tasks on a laptop provided by the researcher, their information search behaviors were recorded using Camtasia, a screen-recording software program that was preloaded on the laptop.

Test participants were also instructed to verbalize their thought processes while completing the search tasks to provide insight into their search and navigation behaviors. Participants' narrations were captured using Camtasia's voice recording feature. These screen and audio recordings allowed the researcher to review the interviews later. Unstructured field-notes would also be used to supplement the Camtasia recordings. Revisions to the Senior Project website followed each round of usability interviews. The revisions were based on participants' comments/suggestions and were intended to improve the website's usability.

Participants' narrations were transcribed from the Camtasia audio recordings. Interview transcripts also included observed search behaviors taken from participants' screen recordings. This was intended to supplement their narrations and give context to the text. The transcripts were reviewed and thematically coded to identify trends in the comments received. Coded comments were then separated into three categories representing the website's appearance, navigation, and content.

Thematically coded comments from the three categories were then uploaded to Wordle.net, a "word cloud" generator, which created a graphic representation of the text provided. The resulting word clouds displayed which words were used more frequently in the source text by giving the word greater prominence in the resulting image. The word clouds were then used to determine participants' impression of the Senior Project website's design and navigation effectiveness.

The transcripts were also used to identify participants' online search behaviors. Participants' search behaviors were categorized into four types of behaviors: scrolling, navigational mouse clicks, scanning, and reading. The number of times a particular search behavior was performed was used to identify trends or patterns in participants' search behaviors.

Results

At the start of each usability test interview, participants were asked to estimate their average weekly internet use and to assess their internet browsing skill levels. Participants' demographic information is provided below in Table 1.

Table 1. Participant Demographic Information

	Participants (n=6)
Gender	Female 2 Male 4
Average Hours per Week Spent on Internet	23.5 Hours per week
Self-Assessment of Internet Browsing Skill	Average 3 Proficient 3

Despite participants' self-reported "Internet Browsing Skill" levels ranging between average and proficient, it was observed that some participants' depth of experience was actually quite limited. For example, one participant commented that he felt the Senior Project website's navigational menu should appear at the top of the page, instead of on the left-hand side, because all of the websites he frequented were designed that way. He also commented that "clickable" links should be identified or marked to help the user navigate the content easier.

When he was later asked follow-up questions about those comments it was found that he only visited three to four websites regularly and that he did not realize that hyper-linked text is often presented in a different color to indicate to the user that they are clickable. The participant was not color-blind and was somewhat embarrassed about not knowing hyperlinked text being a different color. It should be noted that none of the study participants viewed the Senior Project website's "Help Page" which would have provided them with useful information about the website's design features.

Perhaps the most repeated comment from study participants was that they felt pressured while performing the information search tasks, despite completing all five tasks within the allotted time limit. One participant reported that "she didn't want to look dumb, even though she was told beforehand that the test was evaluating the website, not her." At the conclusion of the interviews, study participants were surprised at how short the interview sessions seemed for them. Interview sessions lasted approximately twenty-five to forty minutes. Participants were asked to allow approximately one hour to complete their usability interviews.

Participants' Camtasia transcript narrations were thematically coded to separate the comments into three main categories: website appearance, website navigation, and website content. These coded comments were then uploaded to Wordle.net to generate a "word cloud" for each category. The word clouds were used to gauge participants' impression of the Senior Project website.



Figure 1. Appearance Word Cloud

An examination of the "Appearance" word cloud in Figure 1 indicates an overall positive impression of the website's design with words like "nice," "pretty," and "like" having prominence in the resulting image. This result supports the researcher's field notes indicating that all participants found the Senior Project website appealing, clean, and professionally done.



Figure 2. Navigation Word Cloud

The “Navigation” word cloud in Figure 2 suggests that participants made frequent reference to the navigation menu (tabs), located on the left-side of the website, when completing their usability search tasks. However, according to the researcher’s field notes, two participants appeared to have trouble with the “nested” or “fly-out” menu tabs used to create sub-pages with Weebly.com’s website design template. This issue was addressed by reducing the number of sub-pages used in the navigation menu. Subsequent interview participants were not observed to have any problems with the navigation menu following the revision.

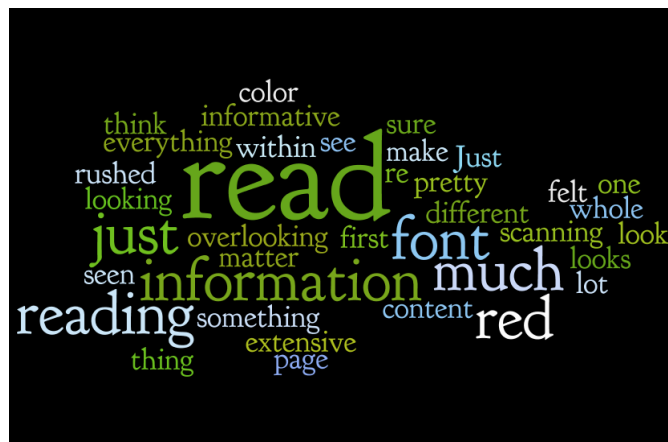


Figure 3. Content Word Cloud

Lastly, the “Content” word cloud in Figure 3 seems to highlight the amount of written content available on the website with words like “information,” “read,” and “much” having prominence. Although the website was designed to support web users’ scanning behavior, the amount of text on the website is substantial, given its original purpose was to replace the seven informational packets used in previous years. The prominence of “red” and “font” in Figure 3 supported the researcher’s field notes indicating that study participants found those web design attributes helpful during their information searches.

A second review of the interview transcripts attempted to identify patterns in participants' search behaviors. The results seemed to indicate that as participants became familiar with the Senior Project website, they tended to become more efficient with their search strategies. For example, participants appeared to use more "scanning" behavior as opposed to "reading" the text for answers. Figure 4 shows the number of times a participant used a particular search behavior when completing the five representative tasks.

		Actions																			
		Task 1				Task 2				Task 3				Task 4				Task 5			
		Scrolling	Navigation Clicks	Scanning	Reading	Scrolling	Navigation Clicks	Scanning	Reading	Scrolling	Navigation Clicks	Scanning	Reading	Scrolling	Navigation Clicks	Scanning	Reading	Scrolling	Navigation Clicks	Scanning	Reading
Participant	1	3	0	3	1	6	1	5	2	0	0	1	0	1	2	2	0	0	1	0	1
	2	0	0	0	2	0	1	0	1	0	0	0	1	2	3	1	1	2	1	3	1
	3	2	0	1	1	2	1	1	0	0	0	1	1	0	1	1	0	0	1	1	0
	4	0	0	1	0	1	1	1	0	7	1	7	1	2	1	1	0	1	1	1	0
	5	0	0	1	0	3	1	3	1	2	2	2	0	0	1	2	0	2	2	2	0
	6	3	2	2	2	3	1	2	0	0	0	1	0	1	1	2	0	1	1	2	0

Figure 4. Number of Times Participants Used a Particular Search Behavior

Although Figure 4 indicates a reduction in the number of times participants "read" the website text to find their needed information, the researcher observed that three participants tried to rely on their memory to find a particular answer, rather than begin the search task anew. This attempt to remember where they saw the information previously had a negative effect on their search efficiency, resulting in longer search times for that particular task. Participants' familiarity with the Senior Project website may also explain the shorter task times needed to complete the last three search tasks. Figure 5 represents the amount of time each participant needed to complete the five information search tasks.

Feedback received from study participants was very helpful for improving the usability of the Senior Project website. As was mentioned previously, two participants demonstrated confusion with the use of sub-pages in the website's navigation menu. Those participants reported that they were not sure if main tabs were clickable, or if they could only click on the sub-pages. When asked why they did not attempt to click on the appropriate tab, they both said they did not know. This confusion was corrected by reducing the number of sub-pages used in the website design to just four, for the "Research Process" page.

Participant	Task Completion Time (in seconds)					Total Task Times
	Task 1	Task 2	Task 3	Task 4	Task 5	
1	40	61	8	10	8	2.12 minutes
2	26	42	1	106	58	3.88 minutes
3	49	41	4	32	13	2.31 minutes
4	13	34	62	64	15	3.13 minutes
5	7	170	52	33	58	5.33 minutes
6	77	33	12	14	10	2.43 minutes

Figure 5. Participants' Task Completion Times

Three suggestions that were incorporated into the website design included:

1. Use "red" colored font to highlight important information
2. Reducing the number of "fly out" menus (two participants found them confusing)
3. Posting important "Contact Information" in multiple locations on the website

Discussion

All study participants completed their information search tasks, but the time each person required to find the correct information varied. This was believed to be the result of some participants being unfamiliar with the educational terminology used in the search tasks and on the website itself. While Krug (2010) acknowledged that users' domain knowledge could affect a website's usability, he contends that most serious usability issues almost always have nothing to do with domain knowledge. Still, domain knowledge issues can discourage users from returning to a website if they find their frustration with the terminology used on the website to be greater than the value of the information needed. With regards to the Senior Project website, parents' domain knowledge may be even more problematic given the large number of immigrant families residing within the school's community. Therefore, simplifying the language used on the Senior Project website will be necessary to accommodate parents who are English language learners.

Other factors that could have affected participants' task completion times were their Internet search experience and their visual literacy skills. As was mentioned previously, the Senior Project website was developed using design considerations that supported users' website "scanning" behavior. Krug (2014) explained that people scan (or skim) websites for information, rather than read them. He likened users' website scanning behavior to cars passing a billboard on the freeway.

However, many of Krug's design suggestions relied on users' experiential knowledge of website conventions, their ability to recognize visual cues like subject hierarchies, and knowing when to scan for information versus reading. Because the Senior Project website

contained informational/instructional content, perhaps users were unsure whether to scan or read the content. This indecisive behavior was exhibited during every test interview. Consequently, a website's usability may depend more on a user's visual literacy skill and web browsing experience, than the overall design of the website. The results of this study support Dunn's (2011) assertion that teacher-web designers must consider users' online savvy before deciding on the amount of interaction required to use the website effectively.

Finally, user distractibility can also affect a person's ability to conduct successful information searches, especially if the distraction is a part of one's online search strategy. Krug (2014) described "satisfice" as users' likelihood to choose, or click on, the *first reasonable option* they find, if there is a good chance it will lead to what they are looking for. According to Krug, people behave this way because they are usually in a hurry and there really is no penalty for guessing wrong. Furthermore, weighing options does not always improve one's chances and guessing is more fun. This behavior was observed in at least two participants' information searches, which ultimately affected the amount of time they needed to complete their search tasks. This may indicate that website interactivity can present distractions for individuals that utilize the *satisfice* search strategy. Therefore, teacher website designers need to identify the purpose of their websites beforehand, in order to determine whether interactivity is necessary to achieve the website's intended purpose, or if it will be an added distraction for users that will negatively affect the website's usability.

The results of this usability study determined the Senior Project website's design and navigation to be effective for its intended purpose with resulting word clouds revealing mostly positive responses and participants' comments being very complementary. However, identifying trends from participants' voice and screen recordings was somewhat difficult due to the study's limited sample size (n=6). Additionally, several participants forgot to think aloud, during their interview, as they completed the information search tasks. This required the researcher to interpret what the participant's screen behavior represented. Bias may also exist in this study's findings due to participants being recruited through personal acquaintances of the researcher.

Conclusion

Understanding how people search for information online is essential for developing a successful website. And performing a usability test can help determine how well the website is meeting its intended purpose. This study focused on parents of high school students as its target audience, but students should also be studied to determine if there are any differences in the way students use the website, as opposed to their parents.

Furthermore, if users' visual literacy skills (e.g., scanning for information, identifying subject hierarchies, etc.) are necessary for successful online information searches, perhaps future studies will shed light on the value of visual literacy instruction to help students to be more effective users of information resources; a skill that will be very important for developing lifelong learners in the 21st century.

References

- Dunn, L. S. (2011, February). Making the most of your class website: Class websites can serve a variety of purposes. What do you want to do with yours? *Educational Leadership*. Retrieved from <http://www.ascd.org>
- Ferrara, M. M., & Ferrara, P. J. (2005). Parents as Partners. *Clearing House*, 79(2), 77-81.
- Janicki, E., & Chandler-Olcott, K. (2012). Secondary English teacher's perspectives on the design and use of classroom websites. *Contemporary Issues in Technology and Teacher Education*, 12(2), 122-144.
- Krug, S. (2010). *Rocket surgery made easy: The do-it-yourself guide to finding and fixing usability problems*. Berkeley, CA: New Riders.
- Krug, S. (2014). *Don't make me think revisited: A common sense approach to web and mobile usability* (3rd ed.). Berkeley, CA: New Riders Press.
- LaRocque, M., Kleiman, I., & Darling, S. M. (2011). Parental Involvement: The Missing Link in School Achievement. *Preventing School Failure*, 55(3), 115-122. doi:10.1080/10459880903472876
- Lunts, E. (2003). Parent involvement in children's education: Connecting family and schools by using telecommunications technologies. *Meridian: A Middle School Computer Technologies Journal*, 6, 1-25.
- Matayoshi, K. (2010). *Senior project revised guidelines, SY 2010-2011* (Hawaii State DOE). Honolulu, HI: Office of the Superintendent.
- Tingen, J., Philbeck, L., & Holcomb, L. (2011). Research reports: Developing classroom web sites for 21st century learning. *Kappa Delta Pi Record*, 47(2), 88-90.
- Unal, Z. (2008). Going the extra step for parental involvement: Connecting family and school with the power of teacher websites. *Journal of College Teaching & Learning*, 5(6), 43-50.