Usability Testing of a School Website using Qualitative Approach

Uttam Kokil and Sandra Scott

College of Humanities and Social Sciences, Kennesaw State University, Marietta campus, Kennesaw, GA 30060, U.S.A.

Keywords: Usability Testing, Think Aloud Protocol, Observational Method.

Abstract: The purpose of a school website is to provide pertinent information to parents and prospective site visitors. A qualitative method was adopted to conduct a usability study to explore how parents interact with an elementary school website in the USA. While the site yielded high ratings in terms of its visual appeal, the usability test uncovered issues compromising its usefulness. Participants cited deficiencies in terms of poor organization of information, and text labels not reflective of the contents, resulting in tedious navigation and unsuccessful searches. Recommendations were made for site improvements with the goal to eliminate usability issues, to make the site more efficient and effective for users.

1   INTRODUCTION

At times, website designers neglect to carry out a website usability testing, even though it is an essential process for ensuring that the site meets the needs of the intended users. That often turns out to be a short-sighted decision as unforeseen problems emerge and users become frustrated. A cursory exploration of a particular elementary school website revealed possible usability issues that warranted testing, and so a usability test was designed aiming to identify specific problem areas through (i) observation of user interaction with the website, (ii) think-aloud protocol (iii) interview with the participants. Following the findings, recommendations were made for implementation to improve the website.

Based on the preliminary issues that were observed, the following objectives were developed for the test: (1) to assess how easily and successfully users find information on the website, (2) to determine how information retrieval relates to the structure of the site, (3) to determine how finding information relates to the organization of the content, and (4) to get users' perspectives on their overall experience with the site. The following research questions were formulated to focus on specific areas contributing to the objectives of the study, as follows: (i) Do navigation paths meet users' expectations? (ii) Is information organized in a logical manner (iii) Is it easy to learn how to use the site? (iv)What kinds of emotional reactions do users express while using the site? (v) Does the appearance of the site make it easy to use the website? (vi) What do users like about the site? (vii) What do users dislike about the site?

The primary users of the school's website are parents who are seeking information about the school. The site features internal information from the school, as well as external information from the school district administration. Piper (2012) views a school's website as an excellent medium for communication between the school and the home. The author believes that the website should facilitate active participation in what goes on at the school—especially for parents—and discusses a number of proactive ways in which one school ensures this. This kind of engagement through a school's website must begin with a site that caters to the needs of its users. This study is focused on a more fundamental level of user need regarding a school website—the ability to find information. Its results will help to ascertain how well the elementary school website functions as a point of contact with the school for its primary users as it relates to finding information with ease.

2   LITERATURE REVIEW

Usability can be evaluated using three major constructs: *apparent usability*, *perceived usability* and *task performance* (Gu et al., 2016). Apparent usability is a user's subjective judgment of ease of use based on the visual appearance of a product. Perceived usability is related to how users feel designated by their subjective judgment of human-

55

product interaction. Performance is an objective usability evaluation concerning the time it takes for a user to complete specific tasks while using a system. The twelve fundamental usability principles concerning website evaluation are referred as Nielsen's heuristics (Nielsen, 1994). Studies on web usability have been conducted from different angles, notably learnability, consistency, satisfaction (Nielsen, 1994), reliability and navigation (Egger et al., 2003), interactivity (Lowry et al., 2006), usefulness (Rubin and Chisnell, 2008). The usability of websites is therefore defined by a number of attributes listed above that provide experiential meaning to users in the interaction with websites. These attributes were useful in guiding the design of the instruments for the usability test, and in indicating necessary areas of focus.

In a study, Hartshorne et al. (2008), examined the effectiveness of elementary school websites, cited four functions of these sites, two of which are considered in this study: providing an introduction to the school itself, and providing access to other related information—such as internal and external resources for members of the school community. The authors analyzed fifty elementary school websites, mainly in the areas of content, structure and design. These areas were detailed in a checklist aligned with factors in this usability test. These include users' impressions of the homepage, aesthetics, navigation back to the homepage, ease of moving around the site and ease of finding information.

Spool, et al. (1997), after conducting usability tests on nine websites (a mix of e-commerce, corporate and other informational sites), found that navigation issues often led to the failure of users to find information. A site structure that users could not follow intuitively was found to be one of the main causes (p. 13). This seemed worthy of investigation, and so tasks were designed in this study that would test the ability of participants to successfully navigate the site. Spool, et al., (1997) also found that a website's graphic design had no effect on the ability of users to find information. In fact, of the sites they tested, the one that was rated the best in terms of usability had mostly text (p. 7). It has been shown that aesthetically pleasing websites have led to positive affect (Norman, 2004; Zhang and Li, 2005), user satisfaction (Cyr et al., 2005), navigation (Battleson, et al., 2001), fun and pleasure of usage (Creusen and Snelders, 2002). Koutsabasis and Isitikopoulou (2013) developed a method for evaluating the aesthetics of websites in Human Computer Interaction, but did not go as far as relating aesthetics to navigation. Moshagen and Thielsch (2011) devised

the *VisAWI* instrument to measure perceived aesthetic quality in websites given the importance of visual aesthetic components play in digital products and systems. Noting the differing opinions, and though not intending to explore the technical details of aesthetics, the opinions of users about the overall appearance of the site—including whether it enhanced the process of searching for information in any way—was incorporated into the current usability test.

In terms of methodology, the think-aloud protocol and the concept of speech genre expounded by Boren and Ramey (2000) were found to be very useful. Speech communication in usability testing essentially provides a refinement of the think-aloud protocol that appears to enhance not only its practicality as a form of human interaction, but, even more importantly, its effectiveness.

An important aftermath of the process is transcription of the audio recordings. Davidson (2009) believed that selectivity and transcription go hand in hand, and that this reality should be explained as it relates to a study. Markle et al. (2011), in referring to interviews, noted the inherent inadequacy of transcription in capturing the emotion behind the spoken word (p. 4), as well as the tedium of the task (p. 3). The authors mentioned voice-recognition software, which is supposed to work well with a single voice (p.10), but such software was unlikely to do justice to the long pauses and under-the-breath, sometimes barely audible, utterances that were part of the recordings in this study. It was therefore found expedient to transcribe recordings of the think-aloud sessions by typing them out. Bailey (2012), and Sauro (2011), demonstrated that tracking test participants' first clicks could yield valuable information in terms of predicting their likelihood of success. This view was also supported in the First Click Testing article at www.usability.gov (n.d.). Hence, the tracking of first clicks was incorporated into this current testing.

According to Pendell and Bowman (2012), five to eight participants are usually required for an effective usability test, but because of the unique requirements of their test, they used twelve. Dickstein and Mills (2000) felt that statistical significance could be inferred from the results of eight to ten participants, but acknowledged that after four or five users they were able to tell if something was problematic. In fact, Nielsen (2012) concluded that five users were enough for an effective test. Ten participants were used for this study. This number was considered ideal to provide a reasonable body of data from which trends, patterns, and results would be very clear for purpose of analysis.

3 METHOD

The procedures for data collection in this usability test were:

- Observation of users performing authentic tasks.
- Administration of pre- and post-test questionnaires.
- Think-aloud protocol.
- Discussions with participants.

A qualitative approach was adopted because of the exploratory nature of the study, especially useful in observing users interacting with the website while using the think-aloud protocol (Preece et al., 2015). A convenience sample of ten participants was chosen from among persons whose children were currently in the school system or had passed through the school system. A wide age range was targeted—18 to 60 years—to accommodate grandparents and others who function as guardians. The generic term "parents" is used throughout the study to refer to all. All participants were female. Individual test was carried out over an eleven-day period.

There were two questionnaires: a pre-test questionnaire and a post-test questionnaire. Both sets of questionnaires were piloted with three persons. The pre-test questionnaire was designed to assess the participants' level of comfort with the Internet, get their initial impression of the website, and provide some demographic information. The proficiency of the participants with the Internet varied, and while it was desirable to have participants who had the capability to interact comfortably with the interface, it was also beneficial to have at least one Least Competent User (LCU) to represent the other end of the spectrum.

The post-test questionnaire was designed to capture the experience with the tasks, likes and dislikes regarding the website, and suggestions for improvement. The recorded think-aloud protocol, supplemented by notes from observations and post-test discussions, provided valuable data that might not have been included while the participants filled the questionnaires.

In order to organize the data, an Excel workbook was created with four sheets as follows: (1) Pre-questionnaire, (2) Post-questionnaire Part A, (3) Post-questionnaire Part B, (4) Task analysis. Part A of the post-test questionnaire consisted of closed-ended questions using the Likert scale for responses, while Part B consisted of open-ended questions. Responses from the questionnaires were logged in text format, and, where applicable, tallied. Thematic analysis was done on the answers to the open-ended questions on the post-test questionnaire Part B to arrive at codes that related to the research questions. **Figure 1** shows the analysis of two comments that were made in response to the question: *What did you dislike about the site?*
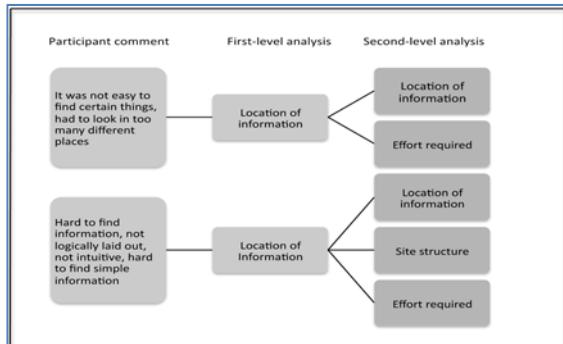

Figure 1: Emergence of Themes.

Themes were derived by two levels of analysis. Initial codes were generated from an overview of the data, then as the data were studied in more details, further aspects of a comment became evident, which warranted separated codes. The frequency with which these codes/themes occurred was then checked to identify patterns. For example, in response to what participants liked about the website, nine out of ten participants, or seventeen out of a total of twenty-four points that were made, mentioned appearance. Location of information was the highest occurring theme in response to what participants disliked. The pre-test questionnaire did not have any open-ended questions, so answers were collated/tallied for each question, or selected answers logged for each person. Transcription of the think-aloud recordings was concentrated on test participants' talk about the tabs and links on which they clicked, so that their routes in performing a search task could be re-created for purpose of analysis. In transcription, those points were put in bold lettering. As Markle, et al. (2011) noted, it is difficult for transcription to capture the emotions expressed by participants. This is inevitably the case when they are not verbalized. Observer notes proved to be a very good backup for this as body language and expressions were noted. Transcription synchronized well with the observer's handwritten notes of critical search paths.

Qualitative data was of paramount importance in this study because, as will be shown in the Discussion section, quantitative data, in the form of time on tasks, for example, provided rather limited information to examine the research questions adequately.

3 ANALYSIS

This section explains how the data collected were applied to each research question. Questionnaires and tasks had been carefully designed to align with the research questions, so the data collected could be related directly to these questions. Table 1 below outlines the specific data used to answer each question. Data from the sources indicated were combined to give a complete picture for each question and ensure that the overarching objectives of the study were addressed.

Table 1: Applying data to research questions.

QUESTIONS	DATA AS INDICATOR
Do navigation paths meet users' expectations?	**Subjective data** Response to post questionnaire statements: "Navigation paths met my expectations", "I knew where I was in relation to the homepage at all times", "I could retrace my paths easily". **Performance data** Homepage tab was selected to start each task, number of tabs/links clicked during search. **Other** "Think-aloud" comments and observations"
Is information organized in a logical manner?	**Subjective data** Response to post-questionnaire statements: "information was presented in a way that made sense", "website is designed to meet users' needs", "I think the site is well laid out". References to location of information in response to post-test questionnaire question "what did you dislike about the site", and to suggestions for improvement. Number of participants that mentioned appropriateness of headings/labels or organization of information in free-form comments.

	Other "Think-aloud" comments and observations.
Is it easy to learn how to use the site?	**Subjective data** Response to post-questionnaire statements: "when I clicked on the homepage tabs I found what I expected", "if I had to do it again I could complete the tasks I did", "if I had to do it again I could complete the tasks I failed", "finding information on the site was easy", "I can find information quickly on this site". References to ease/difficulty of finding information. in free-form comments. **Performance data** Time to complete tasks. **Other** "Think-aloud" comments and observations.
What kinds of reactions do users express while using the site?	Observations and related "think-aloud" comments
Does the appearance of the site make it pleasant to use?	**Subjective data** Response to postquestionnaire statement "the visual design of the site made it pleasant to use", reference to aesthetics in response to post-questionnaire question "what do you like about the site?"
What do you like about the site?	**Subjective data** Answers to this question on the post-test questionnaire, organized by themes.
What do you dislike about the site?	**Subjective data** Answers to this question on the post-test questionnaire, organized by themes

4 RESULTS

In this section the answers to the research questions will be addressed. For the purpose of this qualitative study, the results of the Likert scale responses were interpreted using the percentage of participants that selected the various ratings. The statements in the

table below (and the tables following) are from the post-test questionnaire. Instructions were as follows:

1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, 5 = strongly agree. For the sake of brevity, "agree" is used to include responses of "agree" and "strongly agree", and "disagree" to include responses of "disagree" and "strongly disagree."

Research Question#1. Do navigation paths meet users' expectations?

Table 2: Responses relating to Research Question #1.

DISAGREE	UNDECIDED	AGREE
Statement: *Navigation paths met my expectations*		
90%	10%	0%
Statement: *I knew where I was in relation to the homepage at all times*		
30%	40%	20%
Statement: *I could retrace back my path easily*		
20%	40%	40%

Task Performance data to measure success rate:

Task 1 – Find the Year in Which the School was Built.
- Most popular first click: About Us tab
- Average number of areas clicked during search (including areas clicked more than once): 7
- Success rate: 0 out of 10

Task 2 – Find the School's Hours.
- Most popular first click on homepage: About Us tab
- Average number of areas clicked during search (including areas clicked more than once): 3
- Success rate: 9 out of 10

Task 3 – Find Information on the Gifted Program.
- Most popular first click on homepage: Academics tab
- Average number of areas clicked during search (including areas clicked more than once): 6
- Success rate: 9 out of 10

Task 4 – Find Out if the School has a Clinic and a Nurse.
- Most popular first click on homepage: Staff tab
- Average number of areas clicked during search (including areas clicked more than once): 4

- Success rate: 6 out of 10

Task 5 – Find the School Supplies for a 4th Grade Child.
- Most popular first click on homepage: Academics tab
- Average number of areas clicked during search (including areas clicked more than once): 5
- Success rate: 8 out of 10

Task 6 – Find the Size of the Student Population at Some Point in 2015.
- Most popular first click on homepage: About Us tab
- Average number of areas clicked during search (including areas clicked more than once): 7
- Success rate: 0 out of 10

Research Question#2. Is information organized in a logical manner?

Table 3: Responses relating to Research Question #2.

DISAGREE	UNDECIDED	AGREE
Statement: *Information was presented in a way that made sense.*		
70%	30%	0%
Statement: *Website was designed to meet users' needs.*		
60%	40%	0%
Statement: *I think the site was well laid out.*		
80%	20%	0%

In answers to the open-ended questions on the post-test questionnaire, five of ten participants mentioned "headings/labels" or "organization of information" as something they did not like. In free-form comments during and after the exercise, all participants referred to the fact that "headings/labels" were not helpful or were misleading. The tasks eliciting these comments most frequently were the ones initiated with clicks on the "About Us" tab—the year the school was built, school hours, and student population.

Nine out of ten participants thought the gifted program was misplaced under Parent Resources in the sidebar instead of under Academics (which was their first click). Location of information was criticized by seven participants in response to the post-test questionnaire "What did you dislike about the site?". Six persons included location of information among

their suggestions for improvement on the same questionnaire. All participants expressed problems with the location of information in at least two tasks in free-form comments during and after the exercise.

Research Question#3. Is it easy to learn to use the site?

Table 4: Responses relating to Research Question #3.

DISAGREE	UNDECIDED	AGREE
Statement: ***When I clicked on the homepage menu, I found what I expected.***		
70%	30%	0%
Statement: ***If I had to repeat it again, I could complete the tasks I did.***		
60%	40%	0%
Statement: ***If I had to repeat it again, I could complete the tasks I failed.***		
80%	20%	0%
Statement: ***Finding information on the site was easy.***		
70%	30%	0%
Statement: ***I can find information quickly on this site.***		
80%	20%	0%

In response to the open-ended questions on the post-test questionnaire, four of ten persons said that it took too much effort to find information on the site. In free-form comments during and after the exercise, all participants referred to difficulty in completing at least three tasks (even if they did so successfully). The tasks that elicited these comments most frequently were the ones pertaining to the year the school was built, the gifted program, the student population, and the clinic/nurse.

Average time to complete tasks

Task 1	3.3 minutes
Task 2	1.7 minutes
Task 3	2.8 minutes
Task 4	2.8 minutes
Task 5	2.1 minutes
Task 6	4.4 minutes

Research Question#4. What kinds of reactions do users express while using the site?

Observation and the think-aloud protocol yielded much information in this regard. A number of persons made great effort to find the information, looking at both the school's website as well as the County School District's website to which many links/tabs led, while others (the minority) tended to give up more quickly.

In summary, the main reaction was puzzlement when they were unable to find what they were looking for in what they considered to be logical places. There were a few instances of frustration, while some persons laughed in disbelief either at the futility of their search or the unlikely place in which they found what they were looking for. The sole LCU demonstrated evidence of fatigue pretty quickly. Body language indicated concentration for the most part; persons stopped speaking sometimes as they focused intently on the tasks. Below are some of the participants' comments:

- "I feel like I am going around in circles".
- "They don't make it easy, do they?"
- "Do they even have a gifted program?"
- "Seems as if they don't want you to find it".
- "This is really frustrating".
- "I don't know why they even have that page" (the page behind the Administration tab).
- "I found that completely by accident".
- "About Us doesn't have anything".
- "The sidebar is weird. It's just jumping from one thing to the next".
- "Nice, clean homepage. Once you click on the tabs things go crazy".
- "The order is discombobulated".
- "Visually nice but hard to use".
- "You have to work too hard to find the information".
- "That's a hard spot for it to be".
- "You can't find simple stuff but you can find all the complex stuff about curriculum".

Research Question#5. Does the appearance of the site make it pleasant to use?

Table 5: Responses relating to Research Question #5.

DISAGREE	UNDECIDED	AGREE
Statement: ***The appearance of the site made it pleasant to use.***		
0%	40%	60%

Research Question#6. What do you like about the site?

The themes that emerged from the questionnaire responses to this question, in order of frequency are:

- Appearance.
- Content.
- Diversity, readability, and "not too busy" each got one mention.

Research Question #7. What do you dislike about the site?

The themes that emerged from the responses to this question on the post-test questionnaire, in order of frequency are:

- Location of information (difficult to find).
- Labels (tabs and headings) not reflective of content.
- Layout not logical.
- Too much effort required to find information.
- Navigation back to homepage not clear.
- Misalignment of information on page and sidebar, and the use of acronyms and unfamiliar names (such as "Discovery" for the gifted program) each got one mention.

5 DISCUSSIONS

This study shows the importance of qualitative data in usability testing. The quantitative data, such as the tasks completed correctly (no prompts were given, but generous amounts of time were allowed) does not reveal the circuitous routes that participants took to find the information or the frustration and complaints expressed.

The ratings on the post-test questionnaire pose an interesting dilemma. Though "undecided" is supposed to represent a neutral position, in an exercise of this nature, it in fact ends up being negative. If a user is undecided, whether the site functioned in a way that it should, then the website failed in that respect. It has not fulfilled the organization's intent of providing its customers with a decidedly useful resource to connect with the company. This is, perhaps, the primary purpose behind the development of all company/organization websites. Dumas (1998) noted the potential for the participants to unwittingly "distort" results through their personal tendency to be agreeable, to avoid extremes on a scale, and to avoid giving something a poor rating (p.6). This may be a factor in the undecided ratings in this study.

In hindsight, it would have been better to disaggregate the statement "The appearance of the site made it pleasant to use". All participants liked how the site looked (one person did not state it on her questionnaire but she expressed it to the observer), but when that was teamed with "pleasant to use" it created a problem. The fact is they did not find the site easy to use, but they liked how it looked in terms if its visual design. For that reason, four persons resorted to "undecided" in response to that statement.

The bottom line is that an aesthetically pleasing site cannot compensate for poor functionality. This contradicts the notion of "what is beautiful is usable?" (Norman, 2004).

5.1 Summary of Problems Identified

The pre-test questionnaire indicated that all participants considered a school's website to be very useful if they had a child going to that school. The data that have been presented show that there are issues with the Dunwoody Elementary school website that, in its current form, detract from its functionality and therefore its usefulness. The following deficiencies were revealed, in the order of importance to participants and also of severity in terms of its usability.

5.1.1 Content

The content needs to be reorganized. There are many instances in which information is not located in logical places, that is, in places that a normal user would think to look at, and this was the main complaint of the study participants. Examples are the date the school was built and the size of the school population at some point in 2015. This information is located in a report located under Parent Education, which is under Parent Resources, called 2014-2015 Prospective Parent Night (Figure 2). The location of the gifted program under Parent Resources instead of Academics (nine of ten participants started the search with the Academics tab) surprised many participants as well.
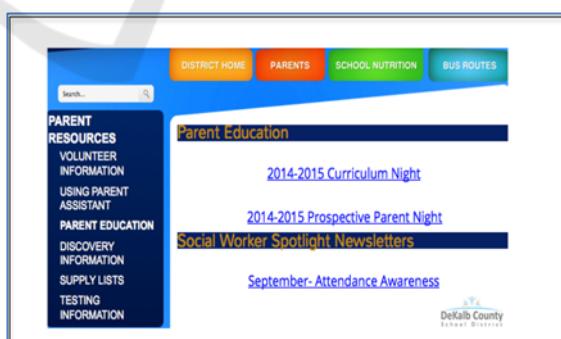

Figure 2: Unexpected location of information.

5.1.2 Labels and Headings

Labels (headings and tabs) need to be more accurately descriptive. They, in large part, do not represent what the participants find when they click on them. The most misleading one is perhaps the "About Us" tab,

which reveals only the school's hours of operation, and its mission and vision (Figure 3). First click tracking shows it to be by far the most frequent starting point for three of the six tasks. It was actually a good starting point only for the task relating to the school's hours. Also misleading is the "Administration" tab that leads to a page with only the name of the Principal.
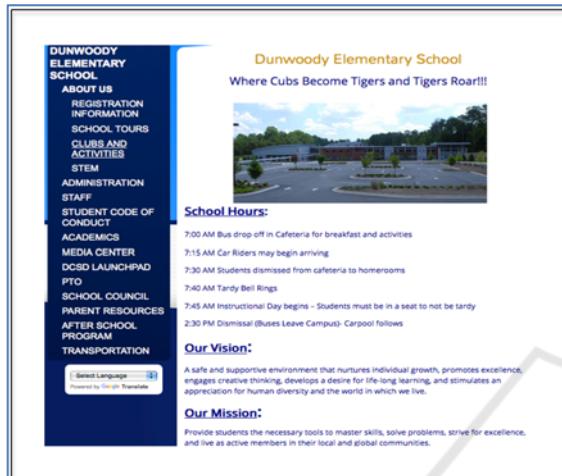

Figure 3: Deficient content inside About Us tab.

5.1.3 Labels and Headings

The website features a running sidebar which functions as the main navigation tool and portal to the problematic site layout. Eighty percent of users did not think the site was well laid out and this is an important measure of its usability. The underlying problems with layout are manifested through this sidebar, so a lot of the usability issues expressed by users were concentrated here. The sidebar appears to create a visual vertical division so that when participants arrive at a page they *either* focus on the sidebar, reading the headings listed while trying to decide which one to click, *or* they focus on the content of the page to the right and ignore the sidebar. This was very evident with the task of finding out if the school has a clinic and a nurse. Once the Staff tab was clicked on the homepage, at least two persons failed to notice "Clinic" very visible in the lineup near the top of the sidebar, and instead went to the content of the page and searched by location/department (Figure 4). Using this route the Nurse is unexpectedly listed under the Front Office department. Two persons left the page

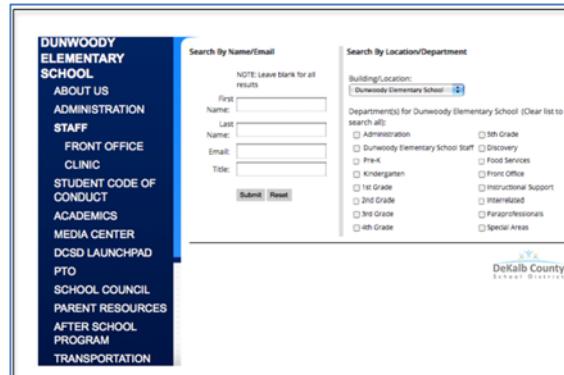altogether and went to explore other areas before coming back to find out "Clinic" on the sidebar.

Figure 4: Incorrect placement of clinic tab.

Another problem with the sidebar is that the headings are not properly formatted. One participant remarked "The sidebar is weird. It's just jumping from one thing to the next. The order is discombobulated. Things need to stick out more". The effect of "jumping from one thing to the next" is caused by the fact that the contents of the sidebar are rearranged to reflect the page that it adjoins as one moves from page to page (note the changes in Figures 2 – 5). Furthermore, things do not "stick out more" because the font is consistent (all caps), so such that the existing hierarchy does not make it clearly visible. Participants, however, like the clarity of the font, so any redesign on this front must be approached with caution.

A third problem with the sidebar is that on some pages, such as *Parent Resources and School Council*, there are indented lists under those headings on the sidebar with different items than what appear on the adjoining page to the right (Figure 3). In addition to that, the Parent Teachers Organization (PTO) appears both as a standalone link in the sidebar and as a link on the Parent Resources page (Figure 5). School
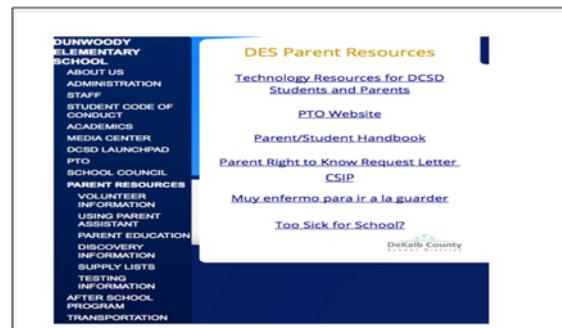

Figure 5: Parent Resources heading shows different links in sidebar.

Council which is immediately under PTO on the sidebar currently appears on the PTO website as well.

6 RECOMMENDATIONS

An encouraging point expressed by two participants is that the site does contain useful information. However, the three main problem areas that have been identified—content, labels and headings, and sidebar (related to site layout)—are inextricably linked. Following are the proposed recommendations based on the results of the usability test.

1. An inventory should be conducted of all the information on the website and items categorized within areas that would make reasonable headings/tabs on the homepage. Users, especially parents, should be invited to be a part of this participatory design process. With the aid of a diagram, categorize the information and map out a more functional layout of the site, to inform the redesign. The school site is not complicated. The single-tier hub-and-spoke structure described by Lynch and Horton (2008) would be an ideal arrangement.

2. The "About Us" tab is standard on most websites. This page needs to be reworked to include more information about the school. In addition to the school's vision and mission, participants indicated that they would like to see the history of the school, enrolment statistics, information on the principal and staff, and a message from the principal.

3. On the homepage, all tabs should be placed in a commanding position at the top of the page to form the main navigation tool. Currently, there are tabs both on the left side and at the top (Figure 6). Three of the four tabs at the top link to the School District; the other is labelled "Parents" and can also be accessed at a lower

Figure 6: Main navigation tabs are located both on the left and at the top of the webpage.

level from the sidebar. This heading does not need to be in two places. It should remain as part of the main navigation.

4. In order to ensure that the user knows where he/she is at any point, the main navigation tool from the homepage should be carried from page to page, with a change in the color of the heading, or bold font, to represent the current location. In addition, users should be able to go back to the home page from any page. There were instances when participants inadvertently ended up on the DeKalb County School District's website, and only realized it when the back tab would not take them back to the school's homepage, because another page had opened up altogether. There should be a message to warn users when they are leaving the school's website.

7 CONCLUSIONS

The Dunwoody Elementary School's website has a lot of potential to be a valuable resource for members of the school community and the wider community. If the recommendations in this report are followed, the website will be more user-friendly. We are living in an age of widespread Internet connectivity, both mobile and otherwise, and websites often represent an important point of contact with an organization as people connect with it through its Web presence. For parents on the go, for example, the school's website should be a quick and helpful point of reference from a smartphone or the tablets. It would be a step in the right direction for Dunwoody Elementary School to treat its website as a virtual ambassador for the school, to develop it with continuous usability testing, and listen keenly to the voice of its users as it does so. A good reference point for further testing would be the work of Hartshorne et al. (2008), in which they generated a checklist to assess the effectiveness of elementary school websites. It is a very comprehensive and expertly crafted checklist, and provides useful parameters for the examination of the Dunwoody Elementary school's website in the future.

REFERENCES

Bailey, B. (2013, October 8). *FirstClick usability testing* [WWW]. Available from: http://webusability.com/firstclick-usability-testing/ (Accessed Nov 20, 2015)

Battleson, B., Booth, A., Weintrop, J., 2001, Usability testing of an academic library web site: A case study. *The Journal of Academic Librarianship*, 27(3), pp. 188-198.

Boren, M. T. and Ramey, J., 2000, Thinking aloud: Reconciling theory and practice. *IEEE Transactions On Professional Communication*, 43(3), pp. 261-278.

Creusen, M., Snelders, S., 2002, Product appearance and consumer pleasure. In W.D Green and P.W Jordon (eds), *Pleasure with products: Beyond Usability*, New York: Taylor and Francis, pp.69-75.

Cyr, D., Bonanni, C., Bowes, J., Ilsever, J., 2005, Beyond trust: website design preferences across cultures. *Journal of Global Information Management 13* (4), 24–52.

Davidson, C., 2009, Transcription: Imperatives for qualitative research. *International Journal of Qualitative Methods*, 8(2), pp. 35-52.

Dickstein, R., Mills, V., 2000, Usability testing at the University of Arizona Library: how to let the users in on the design. *Information Technology & Libraries*, 19(3), pp. 144-150.

Dumas, J.S., & Redish, J.C., 1999. *A Practical Guide to Usability testing*, Intellect. Portland, OR, USA, 1st edition.

Egger, F.N., Cover, J.L., & Producties, J., 2003, From interactions to transactions: designing the trust experience for business-to-consumer electronic commerce. Eindhoven University of Technology.

Hartshorne, R., Friedman, A., Algozzine, B., & Kaur, D., 2008, Analysis of Elementary School Web Sites. *Journal of Educational Technology & Society*, 11(1), pp. 291-303.

Koutsabasis, P., Istikopoulou, T. G., 2014., Perceived website aesthetics by users and designers: implications for evaluation practice. *International Journal of Technology and Human Interaction*, 9(2), pp. 39-52.

Lowry, P.B., Spaulding, T., Wells, T., Moody, G., Moffit, K., and Madariaga, S., 2006. A Theoretical Model and Empirical Results Linking Website Interactivity and Usability Satisfaction. Proceedings of the 39th Annual Hawaii International Conference on System Sciences (HICSS'06), IEEE (2006), 123a–123a.

Markle, D. T., West, R.E., & Rich, P.J., 2011, Beyond transcription: Technology, change, and refinement of method. *Forum: Qualitative Social Research*, 12(3), pp. 1-21.

Nielsen, J. (2012, June 4), How many test users in a usability study? Available from http://www.nngroup.com/articles/how-many-test-users/ (Accessed Nov 04, 2015)

Nielsen, J., 1994, Heuristic evaluation. In J. Nielsen and R.L. Mack, eds., Usability Inspection Methods. John Wiley & Sons, New York, NY.

Nielsen, J. 1994, *Usability engineering*. Elsevier.

Norman, D., 2005, *Emotional Design: Why We Love (or Hate) Everyday Things.* Basic Books. New York, NY.

Pendell, K. D., Bowman, M. S., 2012, Usability study of a library's mobile website: An example from Portland State University. *Information Technology & Libraries*, 31(2), pp. 45-62.

Piper, T., 2012, Using school websites to support parent engagement. *Leadership*, 42(2), pp. 36-38.

Preece, J., Sharp, H., Rogers, Y., 2015, *Interaction design: Beyond Human-Computer Interaction,* 4th edn, Wiley & Sons Ltd, West Sussex, United Kingdom.

Reporting usability test results. (n.d.). Available from http://www.usability.gov/how-to-and-tools/methods/reporting-usability-test-results.html.

Ross, J. (2012, February 6), Communicating user research findings. Available from http://www.uxmatters.com/mt/archives/2012/02/communicating-user-research-findings.php.

Rubin, J., Chisnell, D., 2008, *Handbook of usability testing: How to plan, design and conduct effective tests.* Indianapolis, IN: Wiley.

Sauro, J. (2011, October 19), Getting the first click right. Available at http://www.measuringu.com/blog/first-click.php.

Tuzun, H. et al., 2013, A Study on the Usability of a University Registrar's Office Website through the Methods of Authentic Tasks and Eye-Tracking. *Turkish Online Journal of Educational Technology*, 12(2), pp. 26-38.

U.S. Department of Health and Human Services. (n.d.). Research-based web design and usability guidelines. Retrieved from www.usability.gov.