

## Examining the Usability of a Data Teams Website

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**Abstract:** An increase from the No Child Left Behind (NCLB) Act has put schools and teachers under more pressure to develop methods to increase student achievement scores. The data team method allows teachers to collect data, analyze strengths and obstacles, establish goals, review instructional strategies, and analyze results. In 2013, Aliamanu Middle School (AMS), a public school on the island of Oahu, adopted the data team method of collecting and analyzing student performance in order to improve student learning. Until now, there has not been a convenient method for teams to share their data. I developed a website to house common assessments and student performance data for teams and administrators at AMS to use to locate, analyze, and share. The purpose of this usability study was to examine the ease-of-use and navigation of a data team website designed to house data and resources for teachers and administrators at AMS. Participants included ten teachers and administrators, all of whom were given four specific tasks to complete, and a post-survey regarding the navigation and functionality of the website. All ten participants completed each task with ease. Feedback from participants concluded that the site was user friendly, easy to navigate, served a functional role in the data team process at AMS, but needed more colorful fonts and pictures.

### Introduction

Teachers today have been under pressure from the federal government to increase student achievement scores and to be held accountable for their teaching practices (No Child Left Behind [NCLB], 2002). Various methods have been developed to assist teachers and administrators with the ability to track, record, and analyze student performance data required by the NCLB Act. The data team method is based on a five-step process that allows teachers to: 1) collect and chart data, 2) analyze strengths and obstacles, 3) establish goals—set, review, revise, 4) select instructional strategies, and 5) determine results indicators (Besser et al., 2010).

During the 2013-2014 school year at Aliamanu Middle School (AMS), a public school on the island of Oahu, the data team method of collecting and analyzing student performance data in order to improve student learning was adopted. Teams were established within math, English, social studies, and science (core subject departments), who then created common formative and summative assessments as tools for collecting student

performance data (Peery, 2011). Pre and post-tests are given to track and analyze student growth. In addition, the data team process allows teachers to discuss various types of instructional strategies they used and what seemed to be the most successful.

Prior to this study, AMS did not have a website for teams and administrators to access common assessments, student performance data, or resources. Teams stored all common assessments, lessons, and student performance data in binders. Creating a website for teams and administrators to locate and analyze the data will work towards establishing better communication amongst all involved in the data team process. In an effort to address the issue at hand, I have created a data team website via Wix website creator, for teachers and administrators at AMS to use. The website not only houses each teams' student performance data, but includes their common assessments, lessons, and resources regarding the data team process. After speaking with administrators at AMS, they have decided to keep student identification confidential on the student performance data templates by using their first and last initials only. Thus, the student performance data that will be housed on the website will only have student initials and assessment scores embedded in it.

During weekly faculty meetings, teachers and administrators brought up the issue of not being able to collectively house and access information from each data team. The ultimate goal was to have the website incorporated into the data team process at AMS by housing data and resources. The purpose of this usability study was to examine the ease-of-use and navigation of a data team website designed to house data and resources for teachers and administrators at AMS. Research questions for this evaluation included:

- RSQ1: How do participants rate the ease-of-use and navigation of the website?
- RSQ2: How do participants rate the functionality of having the website incorporated in the everyday data team process at AMS?

## **Literature Review**

A study conducted by Aziz, Kamaludin, and Sulaiman (2013) examines formative evaluations, particularly usability studies, and explains that a usability study is one of the most important processes to determine the usability and quality of a website. In addition, Krug (2010) notes that a usability study is used to observe people as they try to use something with the intent of making it easier for them. This usability study was created to determine if the site was user friendly and easy to navigate; and if it was a useful tool that would be implemented in the data team process at AMS.

Feedback gathered from a usability study helped to improve areas of the website that are difficult for users to navigate, especially since ease-of-use and navigation are critical components in determining website usability (Pearson & Pearson, 2008). Being able to gain key feedback from participants assisted with further development and alterations of the data team website. In addition, the usability study helped to improve areas of the website that some users found difficult to navigate. Finally, a study conducted by Pearson and Pearson (2008) examines how usability studies can be specifically designed to

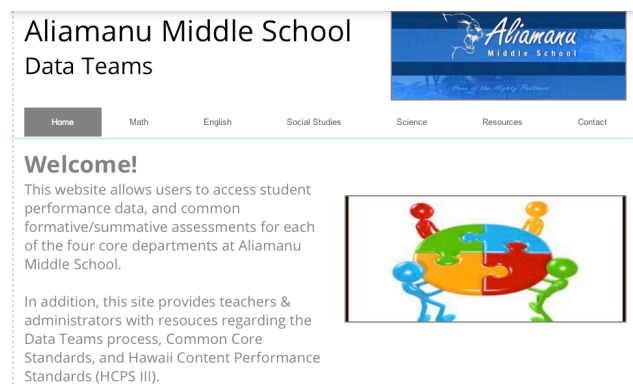
evaluate the ease-of-use and navigation of such website. The overall goal of a website is to allow users to access information that they desire in the fastest and easiest way possible (Rosen & Purinton, 2004).

## Project Design

### *Development*

According to Rosen and Purinton (2004), it is crucial to have a web design that is functional and easy to use. After reviewing a variety of website creators I chose to use Wix, a free web creator, to create my site. The overall design of the site is clean and simple with readable font size, basic colors, and minimal images. According to Hall and Hanna (2004), it's key to use black on white or a close color combination of text in order to ensure that users can easily read the text. Finally, the visual design aspects of a website specifically layout, typography, font size, and color scheme have a significant impact on how users assess the websites credibility (Fogg et al. 2003).

The home page (Figure 1) explains the purpose of the site so teachers and administrators understand what they are able to access throughout the site. According to Swanson and Green (2011), the purpose of a homepage is to add value to all of the information provided by making them easy to find. Finally, Liu et al. (2008) notes that the homepage is the first thing users see, and can often determine if they are interested in viewing anything else on the site.



**Figure 1.** Homepage of the Data Teams Website

There are separate tabs/pages for each core subject to house their assessments and student performance data. Each page is split into two separate sections, one for 7<sup>th</sup> grade data and the other for 8<sup>th</sup> grade data. Within each section there are three sub-sections: common formative assessments, common summative assessments, and student performance data. In addition, the site is equipped with a resource page (Figure 2) that houses informational videos and links to resources such as the data team process, Common Core Standards, and Hawaii Content Performance Standards (HCPS III). These resources assist teachers in creating their common formative and summative assessments within the data team process.



**Figure 2.** Resource Page of the Data Teams Website

### *Participants*

As Foley (2011) notes, usability refers to the functionality of a website for a broad group of people. One week prior to the actual study I sent out a recruitment email, and quickly received responses from the AMS staff regarding their interest in participating. Participants for this usability study consisted of seven AMS core teachers, the technology coordinator, and two administrators (principal and vice principal), all of whom have basic computer knowledge. These participants were the primary users by accessing assessments and student performance data from their department as well as other departments, and accessing resources regarding the data team process via the website. Two data team leaders were used as subject matter experts (SME), since they are the ones who are in charge of their teams' information during the data team process.

### *Instruments*

The collection of feedback from participants during the usability study was conducted through task completion, cognitive interviews or *think alouds*, and a face-to-face survey questionnaire rating the ease-of-use of the website. Sample task completions included “locate and download an 8th grade English common formative assessment for Quarter 2,” and “locate and watch a video explaining the data team process.” In addition, cognitive interviews were recorded during the usability study via Google Hangouts on Air, which records live audio and video screen shot sessions. The recordings allowed me to go back and view task completions, as well as get an accurate account of what the participants said during the study.

Finally, the face-to-face post-survey allowed participants to rate the ease-of-use of the website, the functionality of the site being used in the data team process at AMS, as well as the design of the site. According to Crowther et al. (2004), usability studies evaluate navigation, layout, instructional aids, pace and flow of material, and aesthetic appeal. Conducting a usability study using the formative evaluation method is intended to help ensure that feedback is incorporated so the website is not only easy-to-use, but is

functional and serves a purpose in bridging that communication gap amongst teachers and administrators during the data team process at AMS.

The survey was designed using the 6-point Likert scale rating, where participants rated how easy-to-use they believed the website was. For example, “on a scale of 1 to 6, with 1 representing strongly disagree and 6 representing strongly agree, the website was easy to use?” Additionally, cognitive interviews were encouraged (via Google Hangouts on Air) to record participants narrative, or thoughts, during and after the usability study.

### *Analysis*

Analysis of the data was done using both quantitative and qualitative methods. Instrumentation for the study included a face-to-face, pre-and post-questionnaire. The pre-questionnaire helped me get an idea of the technological background of participants, and if they’ve ever had experience creating a website themselves. During the usability participants were given four specific tasks to complete, and they were not given the next task until the current one had been completed. Participants were also timed during each task to examine how long it took them to successfully complete it. The task completions and time log assisted me in analyzing the overall ease-of-use and navigation of the website, and to make any necessary revisions. The post-questionnaire provided me with key information based on the ease-of-use and navigation of the site, as well as the role it could play in the data team process at AMS. In addition, during the face-to-face study I took notes based on what the participants said and did as they navigated the website and attempted to complete their tasks. I used their narratives to make revisions to the site that I felt were necessary.

### **Timeline & Goals**

The development of the website prototype was finalized in mid-December 2014. The actual usability study took place in three cycles over a ten-week period. I allowed myself one to two weeks to generate a report of my findings during the usability study, and was fully prepared to present my completed report at the 2015 Teaching, Colleges, and Community (TCC) Hawaii Conference.

In order to effectively manage my time, Table 1 was designed to outline the estimated timeframe for the development, evaluation, and feedback analysis of this usability study. In addition, it is broken up into four cycles, which outline tasks that took place during that time period.

## Methods

**Table 1.** Prototype design and evaluation schedule

Cycle	Time	Development	Evaluation
1	3 weeks	Develop prototype of data teams website.	Conduct formative evaluation with SMEs
2	3 weeks	Analyze evaluation data, revise and develop second draft of the website.	Conduct usability study
3	3 weeks	Analyze evaluation data, finalize website prototype.	Conduct usability study and final collection of feedback
4	1-2 weeks	Report findings & complete report.	

During Cycle 1, I developed and finalized the prototype of the data team website via Wix website creator. The prototype was finalized in mid-December 2014, and the first formative evaluation was conducted in early-January 2015, with two SMEs. Table 2 outlines the four tasks participants needed to complete during the usability study. In addition, participants were timed during each task to examine the how long it took them to complete it.

**Table 2.** Usability Study—Tasks

Task	Completion
Locate and access an 8 <sup>th</sup> grade science common formative assessment for quarter 2.	Y/N
Locate and access 7 <sup>th</sup> grade social studies student performance data.	Y/N
Using this website, how would go about finding information regarding the data team process?	Y/N
Locate and watch a video regarding the data team process.	Y/N

Participants were encouraged to narrate their thoughts out loud, and were recorded using Google Hangouts on Air while they evaluated the website. Prior to the evaluation, participants answered a series of questions pertaining to their prior technology knowledge and experiences. By early-January 2015, I collected all of the feedback from the SMEs. Unfortunately, these participants didn't quite understand the function of a usability study or *think alouds*, and simply kept telling me "Looks great!" The one piece of feedback I received from participants was to increase the font size, which I did. I also learned that the video on my site couldn't be viewed unless participants were on faculty Wi-Fi, and I made a note of this for future cycles.

Cycle 2 began in mid-January 2015, and included revisions based on feedback from Cycle 1. Two AMS core teachers, the AMS technology coordinator, and the

vice-principal were participants during this cycle. Participants were encouraged to narrate their thoughts out loud, and were recorded using Google Hangouts on Air while they were evaluating the website. Once the study was finished a series of questions pertaining to the ease-of-use were asked using the 6-point Likert scale. By the end of January 2015, I had collected all of the feedback from participants. Revisions based on participant feedback included changing the text color and adding the AMS mission statement to the website homepage.

Cycle 3 began in February 2015. Participants for this cycle consisted of three AMS core teachers and the AMS school principal, and followed the exact same protocol and steps as Cycle 1 and 2. By mid-February 2015, I collected all of the feedback from the participants. Revisions based on participant feedback included adding a link to the AMS school website, adding content descriptions to the subject and grade level pages, and adding descriptions to the links that are located on the resource page.

Cycle 4 began in mid-February 2015, and was used to add revised department data documents to the website, review and analyze my findings, and complete my final report. I used the remainder of the time to receive peer feedback on my report and prepare for the 2015 TCC Hawaii Conference.

## Results

In the pre-questionnaire, participants were asked a series of ten questions regarding their experience and interaction with the Internet and website creation. All participants stated that they spend at least five or more hours per week using the web. In addition, all of the participants use the web to find solutions. Finally, only three out of ten participants have ever built a website prior to the usability study.

Table 3 outlines the expected time of completion for each task and the actual (average) time it took participants from all three cycles. Task 1 took much longer than expected due to the fact that one participant couldn't locate the document on her laptop once it was downloaded, but the document was eventually recovered by the participant and the task was marked as complete. Task 4 requires participants to view a YouTube video on the data team process. However, the State of Hawaii Department of Education blocks YouTube videos unless you are on faculty Wi-Fi, and one participant couldn't view the video until she switched to faculty Wi-Fi. Although the actual (average) time took longer than expected, all four tasks were completed successfully by all participants, and some even completed tasks under the expected time.

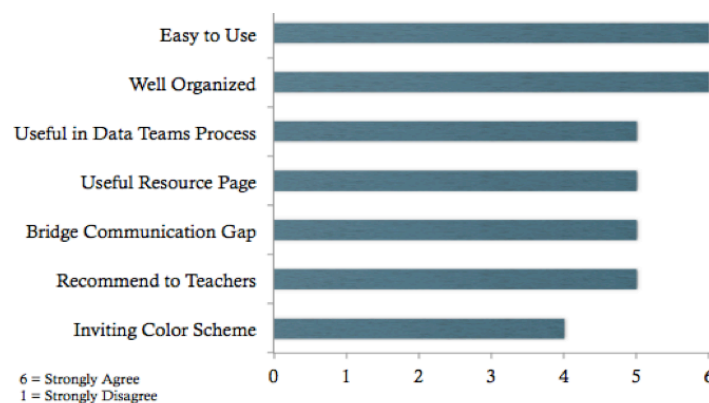
**Table 3.** Usability Task Completion Time

	Task 1	Task 2	Task 3	Task 4
Expected	24 sec.	36 sec.	5 sec.	6 sec.
Actual (average)	1 min 4 sec.	54 sec.	8 sec.	12 sec.

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Note. All tasks were successfully completed.

Upon completing the usability study participants were asked to complete a post-survey based on a 6-point Likert scale, with six being strongly agree and one being strongly disagree. Figure 3 shows the average rating from participants during the post-survey questionnaire. Participants strongly agreed that the website was easy to use and well organized. Usefulness in the data team process, usefulness of the resource page, bridge communication gap, and likelihood of recommending the site to other teachers all received a five. Participants noted that all of these would have received a six out of six, but would be based on the implementation of the website during the data team process. Finally, color scheme received a four out of six due to the fact that many participants would have liked to see more color and noted that the site was too grey.



**Figure 3.** Post-Survey Results

The overall feedback from participants was that the website was very well organized. The layout was easy to use and navigate, thanks to the separate team and grade level pages. The resource page was a great tool to include, and helped users refresh their memory regarding the data team process, common core standards, and Hawaii state standards. Finally, all of the participants noted that the site was extremely easy to access. They didn't need to bother looking through binders; instead all of the information was right there on the website.

Suggestions for the website included changing the color of the font, which I changed from grey to a dark blue (Figure 4). This is still close to the black and white color text variation as noted by Hall and Hanna (2004), and is also an AMS school color. The font was a little too small for some participants to read, so I increased it from 18pt to 22pt. One participant suggested including a link to the AMS website. I added the link on the resource page and to the AMS banner as well, which is located at the top of each page (Figure 5). Another participant suggested adding the AMS mission statement to help create a sense of connection back to the schools goals, and I ended up including this on the homepage (Figure 6). Finally, a participant suggested adding a calendar to the website. I decided against this because AMS already uses both Google Docs and Lotus Notes Calendars. I didn't think it was necessary to include this on the website as well.

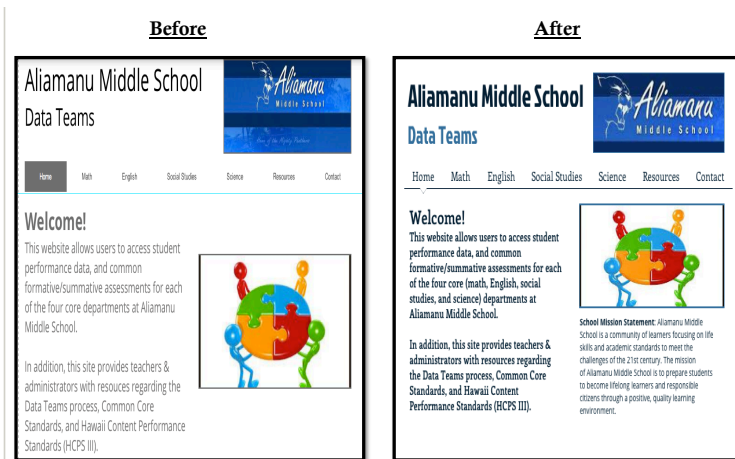


Figure 4. Before and after revisions of the homepage.



Figure 5. Links to the AMS website located on the resource page and school banner.



Figure 6. AMS mission statement on the homepage.

**Discussion and Conclusions**

To refer back to my goal, I wanted to create one common website to house data team information, which I did. Not only are assessments and student performance data located on the website, but information and resources regarding the data team

process and standards are housed there as well. I wanted to convert the packed binders to electronic documents. This took quite some time, and even delayed my project timeline, but was successfully completed. I wanted to create a website that was accessible to each team and administrators.

As mentioned, key feedback from my participants included how the website made it easy to access materials and information; everything is there at the click of a button. Finally, I wanted to bridge the communication gap between teams and administrators. The two administrators who participated mentioned that the site makes it very easy to access team assessments and data whenever they need it. In addition, data team participants noted that this was a great way to see what other departments are doing in terms of assessments, projects, and classroom practices.

One major obstacle I ran into early on during the study was that some participants didn't quite understand the process of *think alouds*. They didn't provide me with much of a cognitive narrative while they were using the website, or just kept saying "Looks great!" which didn't help me much. I was able to correct this before moving on to future cycles by explaining the process in more detail to participants. This turned out to be beneficial because other participants provided me with very detailed cognitive narratives and feedback while using the site.

The school principal was a participant during the study and provided me with key feedback. He was able to see how useful the site would be in the data team process, and has decided to fully implement it during the next school year. This is great news considering the fact that teams won't be meeting as often as they do now. The website will provide easy access to materials in between meetings. I'm currently working with teams to upload revised assessments and data, as well as grant data team leaders permission to upload materials to the site as needed. Since AMS is not the only school in Hawaii to use the data team method, I'm hoping that a website like this will be implemented in other schools as well. This would be a great feature for schools to have to ensure that their information is accessible, organized, and available to all involved in the data team process.

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