Evaluating usability of an online resource site for LTEC online master's program students

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Abstract

This project aimed to design and evaluate an online orientational resource site for online LTEC Master's students to help navigate their academic journey. Resource content was determined by consulting LTEC faculty as subject matter expert, conjointly based on the designer's experience and frequently asked questions by LTEC students. Improvements were made to the site with feedback and rapid prototyping from three iteration of usability testing involving current students and alumni. Qualitative and quantitative data from the pre and post questionnaires, usability tests, and post interview were analyzed to identify any usability issues. Based on Nielsen's (1995) 5-level scale for rating the severity of usability problems, each problem was rated and fixed by prioritizing highest severity of the usability issue. Overall, the usability study suggested that the orientation resource site is user friendly, easy to navigate, and will be a welcomed addition to existing support provided by the department.

Keywords: Online Resource Site, Usability Study, Online Postgraduate Program

INTRODUCTION

The Department of Learning Design and Technology (LTEC), University of Hawaii welcomes approximately 10-20 online master's program (OTEC) student annually. The students come from all walks of life, ranging from students who want to further their studies after graduating from their bachelor's degree, to teachers and professionals in various fields who want to develop their knowledge in designing learning and training with technology. The goal of the program is to provide personal and career development opportunities to those with time and distance constraints to attain a degree in an accredited post graduate program. Students are admitted in the distance program based on personal preference and their proximity to the campus. Priority is given to those who are either unable to commute to the college weekly in a reasonable timeframe. Students are required to attend a compulsory campus-based, 3-day weekend orientation at the beginning of the program. Though it is often tough for students to take time off work and be away from their daily responsibilities, it is essential for them to participate in the face-to-face orientation to meet their faculty and peers in order to build a learning community before they return home and join their classmates in their online courses. Much effort and lessons from past experience have been incorporated in designing the on-campus orientation, receiving high praises from students. Nonetheless, due to time limitation, the vast amount of content and accumulated fatigue during the on-campus orientation, all these factors increase the difficulty of taking in and retaining the information being presented. Throughout the program, many find themselves frustrated due to having trouble with administrative processes, missing administrative deadlines, or having trouble locating vital campus resources etc., resulting in unnecessary anxiety on top of already time crunched and stressful academic life.

As the instructional support to the department of LTEC, the designer's role is to assist students in resolving administrative issues and provide them any with additional support that is non-academic related. A usability study was conducted to facilitate the development and evaluation of an online orientational resource site. The goal was to create a user friendly and centralized platform to provide vital information to incoming OTEC students and encourage them to learn more about the LTEC community and build upon the spirit of LTEC Ohana, as they transition to postgraduate school in an online setting. It is not to replace the physical orientation but provide a one stop shop as an enhancement for students to find resources, simplify the administrative processes, and allow students to begin to create connections, stay in touch with department updates and events in the future. The purpose of a usability study is to rapidly and efficiently gain insights into user's experience from early on and throughout each stage of the development

of a website in order to continuously make improvements to the site (Krug, 2010). The study assessed the design, navigation and usefulness of the resource site and aimed to answer the following research questions:

Q1. How do participants rate the design and ease of use of the online resource site to locate information they needed?

Q2. How do participants rate the ease of navigation of the online resource site to locate information they needed?

Q3. How do participants rate the usefulness of the information and resource provided on the website?

LITERATURE REVIEW

ONLINE ORIENTATION AND RESOURCE SITE DESIGNS

Orientation programs are designed to achieve various goals, ranging from the purely social to the technical aspects of registering for classes and paying tuition. Boening and Miller (2005) found that positive orientation program experiences have been correlated to self-esteem, involvement, academic performance, and overall institutional satisfaction. Online learning has grown exponentially in the past decade; however online orientation has only rose to popularity in the last few years. Nonetheless, few studies have investigated the benefits of online orientation for online programs, especially in postgraduate arena, where prior research is mostly limited to undergraduate or professional training (Jones, 2013; Gold, 2013). Considering the proliferation of online courses and programs worldwide, it is important to examine how online orientation and resource sites could impact academic success and learning satisfaction. The review of literature suggested numerous topics to be covered, ranging from technical skills to soft skills needed to prepare students for their online program. Jones (2013) found it effective to include topics such as "how to be a successful online student, navigating the learning management system(s), important online student services". Similarly, (Bozarth, Chapman, & LaMonica, 2004; Liu & Adams, 2017) empathize the importance of orienting students to the e-learning environment, and skills needed for successful online learning such as communicating with peers and instructors, participation online, collaborating with team members, and managing time efficiently. These are supported by Lehmann, Hähnlein, and Ifenthaler (2014), proposing that directed preflective prompts are instrumental in assisting online learners to master self-regulated learning and activate positive motivation within e-learning environments.

USABILITY STUDIES

To test an online orientating resource site, a usability study was pivotal to determine the efficiency and user friendliness of the platform. Well-designed user interfaces should only include crucial information presented in a logical progression to prevent cognitive overload and maintain interest (Wang & Chiu, 2011). Usability is defined as "a technology's capability to be used easily and effectively by the specific range of users, given specific training and user support, to fulfill the specific range of tasks, within the specific range of environmental scenarios" (Shackel, 2009). While various versions of usability testing are utilized by evaluators (Bergstorm, 2013; Krug, 2010; McDonald, Edwards, & Zhao, 2012), most variations involve observation of participants using a product while implementing a think-aloud method. Users verbalize their actions and thoughts as they perform set tasks, as well as reflecting on the experience after the completion of tasks retrospectively to provide qualitative and/or quantitative data about the user experience. For this usability study, Nielsen's Severity Ratings for Usability Problems (Nielsen, 1995) were used to rate problems identified in the platform based on participants' responses throughout three iteration of testing (see Table 1). The severity of the usability problem could be classified as not a problem at all, cosmetic, minor problem, major problem or catastrophic. The usability problems classification is useful to determine which problems are more important to be refactored or improved in future release.

Table 1.

Nielsen's Severity Rating for Usability Problems

Level	Description
0	*I don't agree that this is a usability problem at all*
1	*Cosmetic problem only: need not be fixed unless extra time is available on project*
2	*Minor usability problem: fixing this should be given low priority*
3	*Major usability problem: important to fix, so should be given high priority*
4	*Usability catastrophe: imperative to fix this before product can be released*

PROJECT DESIGN AND DEVELOPMENT

Internal questionnaires, unofficial interviews as well as review of literature indicated the need for extra support that orients students to the online learning environment, including technical skills such as familiarizing of online learning management systems and online applications utilized during the program, as well as soft skills that are required for online learning, such as time management, online collaboration and communication (Bozarth et al., 2004; Liu & Adams 2017). The development of an online orientation and resource site seem to be a plausible solution to encompass the above. Since the intention of this project was to focus on foundational and crucial information that compliments the physical orientation, to avoid a redundancy of overlapping information and cognitive overload, the designer consulted four faculty who are knowledgeable with the online Master's program and campus orientation, including two program coordinators, to act as Subject Matter Expert (SME) via questionnaires, to provide suggestions of topics to design the website around. The designer also narrowed the content down based on her own experience as the office manager and LTEC Master's program student, and frequently asked questions by LTEC students.

Canvas Instructure was used as the learning management system (LMS) as it is one of the main LMS used by LTEC faculty throughout the OTEC program. This was to allow students to explore the LMS prior the start of their program in a risk-free environment. Canvas was also selected based on its ease of configuration and usage in the design point of view, and the ability to limit access to students in the program. Moreover, the LMS is available to the public free of charge, therefore shall lessen the financial burden for the department and the students. Content was divided into modules with four main topics: 1. Introduction to the LTEC Ohana, which includes information about the department, faculty, staff and LTEC's professional and social networks. 2. Online Registration including troubleshooting 3. Online Learning Skills and Teamwork Skills, including information about what makes a successful e-learner and an online team member. 4. Basic Technology Requirements and Tools needed for the program.
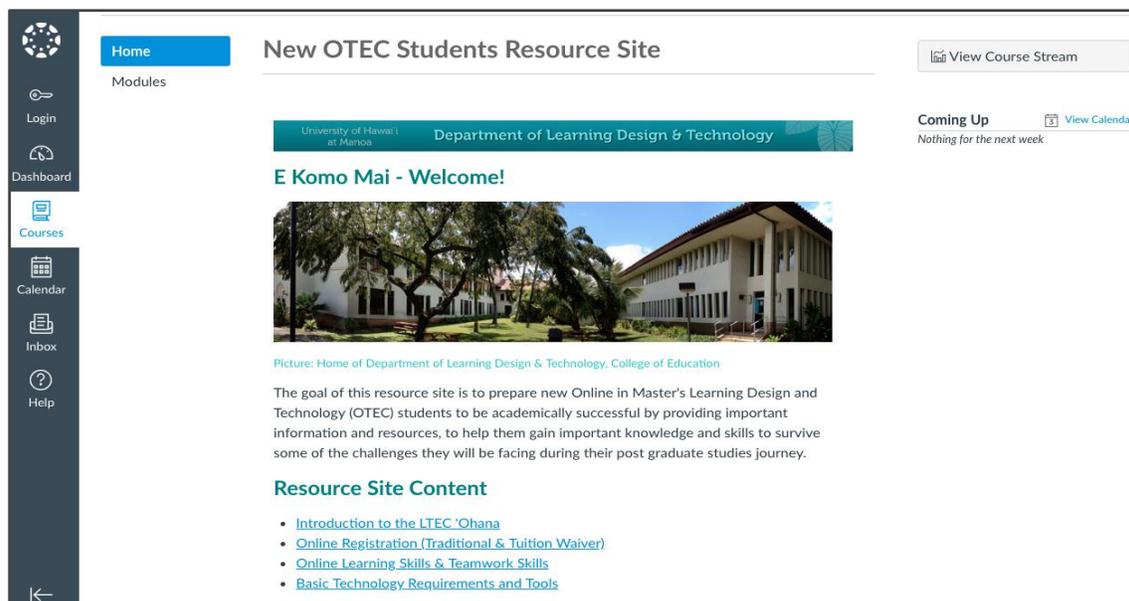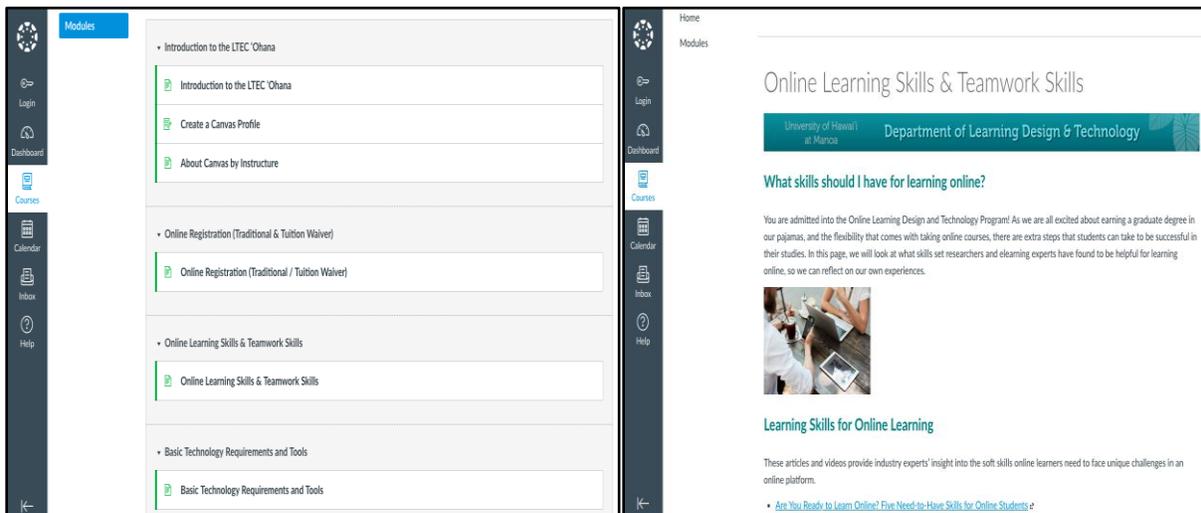

Figure 1. Homepage

Figure 2. Module content list and sample module

As shown in Figure 1 and 2, the homepage and modules were designed with a simple structure and simple directions. To enhance visual aesthetics, maintain attention and create a "sense of place", graphics of College of Education, the LTEC office, faculty, staff and students were included to portray the feeling of visiting the physical campus. The theme of the modules would be adhering to LTEC department's color scheme to strengthen students' sense of belonging and brand recognition. The design included consistent font type, font size, and effective use of white with space strategically placed graphics and icons. Research suggests that graphical icon, colors, images give a website higher attractiveness and could improve on user satisfaction (Zhang, Small, Von Dran, & Barcellos, 2000). Multimodal learning strategy were employed while delivering content in order to cater to the program's diverse student population, so students can be "exposed to different forms of delivery and maximize the chance for overall success" (Menchaca, 2014).
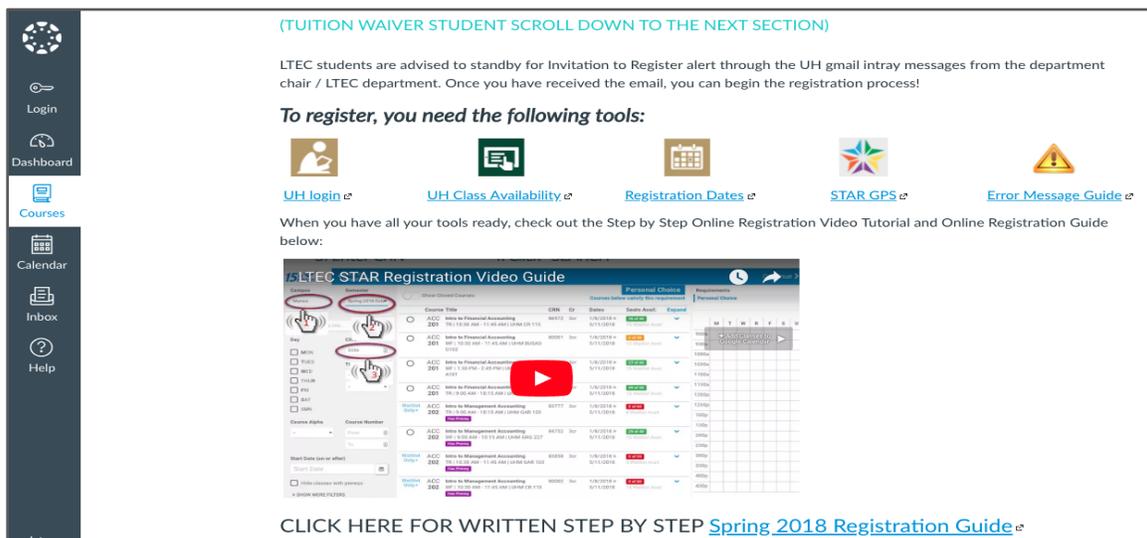

Figure 3. Original voice over instructional video & written registration guide

Instructional videos were one of the main media used to present learning material. Since questions regarding the process of "Registration" is one of the most frequently asked topics by students, original instructional videos with audio voice-over were created, including step-by step screenshots that act as a guide for students to follow (see Figure 3). A written guide was also provided as an option for viewing. These videos were intentionally shorter videos with informal conversation style which is found to be more engaging according to Guo, Kim & Rubins' (2014) extensive

empirical research. These videos were modeled after University of Hawaii STAR system's tutorial videos for consistency.

METHOD

Participants, instruments and procedures

The primary target populations of this online orientation resource site are the new students admitted to OTEC annually. The test population "LTEC Master's students" were selected as a sample group for the target population "new OTEC", which are the intended users for the online resource site. A sample population was required since the target population group was not available for this usability study. At the beginning of Spring 2018, the participants were recruited by sending a participant recruitment email blast to the LTEC department's listserv emails. The email included an online informed consent outlining the details of the study, its benefits and risks, as well as a privacy and confidentiality clause. By filling out and submitting the online form, participants agreed to participate in the project. They were also asked to complete a short pre-questionnaire, which collected their demographics information, experience with program orientation, online resource websites, and skill level with educational technology.
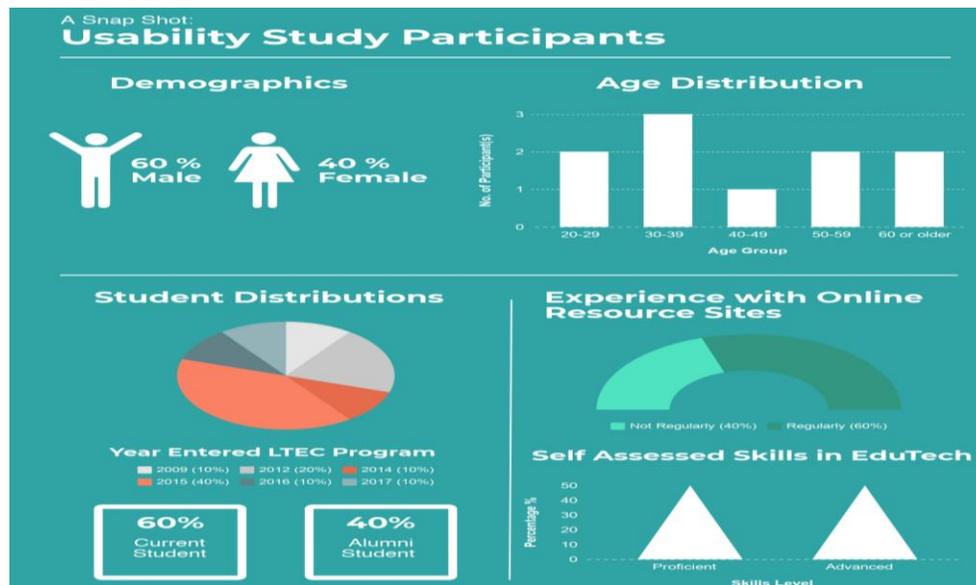

Figure 4. Summary of participants' information

The test population consisted of 11 individual LTEC Master's students, current or alumni, which produced sufficient data for comparison and allowed for drop out. One participant's test data was excluded in the analysis, as the post-questionnaire was not completed in due time. Participants were adults with a higher education degree and were current or alumni of the Learning Design and Technology Master's program at University of Hawai'i at Mānoa. The rationale behind the selection criteria was that the requested group of participants will be a good representation of the actual users of the site and were within the investigator's locus of control. Subjects of the study included current students and employees at the Department of Learning Design and Technology. They were protected from coercion and undue influence through explicit informed consent that their participation was strictly voluntary and that they were not required in any way to participate. Refusing to participate would not affect their academic or job performance in any way, and that they were free to stop at any time. There were also minimal risk or benefits for participating. Figure 4 is a snapshot that summarizes the information of the study participants. The study included 6 males and 4 female participants, with students across various age groups. About the same number of current students and alumni volunteered to participate in the study, and these students entered the programs in different years, all the way back from 2009. All of them had experience with online resources site, and not surprisingly, they considered themselves having proficient or advanced educational technology skills, since they are or were all LTEC students, who are usually well versed in technology.

There are two ways for volunteers to participate in the usability tests during the time from January - May 2018. One option was to participate through moderated testing online, where students were instructed to share their computer screen for recording screen activities, as well as for designer's observation. The second option was moderated testing in-person at a mutually agreed upon time at Wist Hall, University of Hawaii at Mānoa using a computer provided by the designer. Screen activities were also being recorded for this option. The usability study protocol was based on Steve Krug's book Rocket Surgery Made Easy, following the concurrent think aloud method. During the testing, the participants were asked to complete 5 specific tasks, which helped the designer identify issues on the platform. Participants were asked to think out loud as they perform the tasks, and their comments (audio) and impression of the resource site were recorded along with the screen activities. After the completion of the tasks, they were asked to complete a short post-questionnaire. The objective of the post-questionnaire was to collect data of the participants' perception on the design layout and ease of use, navigation efficiency, and usefulness of the resource site by using 5-point Likert scale questions. Finally, before the conclusion of each session, a short post-interview was conducted to gauge comprehensive feedback from the participants regarding their experience with the resource site.

The designer conducted three rounds of testing, each involving 3-4 participants. Each testing sessions averaged between 30 - 45 minutes. The designer developed the instruments including the usability test protocol, pre and post-questionnaires, as well as the post-interview questions. The designer and principal investigator were the only ones who know the identity of the participants of the study. All data were stripped of identifiable information after it was collected and analyzed. No confidential information was collected about the subjects. Google forms were used to administer the pre and post-questionnaire to gather information, where the questions were directly submitted online and collected digitally for response analysis. Both Canvas Instructure and Google forms were freely available to the public use in the public domain, and all results from the quizzes and questionnaire were used for the sole purpose of this study.

RESULTS

ITERATION ONE

During the first round of the usability study, all three test users had a positive impression with the resource site. They agreed that the simplicity of the layout of the website was appealing and noticed the color theme of the site was consistent with LTEC's departmental color. All participants stated that they thought the amount of information to be appropriate and not overwhelming, and the topics chosen were suitable for what they perceived was the purpose of the resource site. In addition to the affirmative feedback, participants provided critical comments and constructive suggestions for improvements. In the area of design and layout, the test users quickly noticed that there were some inconsistencies with font sizes, color of the titles, and some text were not left margined. One participant also pointed out the bullet points used in subtopics were redundant and made the layout looked "messy". These errors were rated as *cosmetic problem(s) only* on Nielsen's 5-level scale, problems that were the least severe. However, since they were easy fixes, the designer made it a moderate priority to resolve these issues. Moreover, it was apparent that there were a few issues in the area of navigation, with the most prominent one being that all three participants took a relatively longer time to navigate to the module pages, though there were instructions on the homepage to instruct users to start browsing information by clicking the "Module" button on the navigation bar on the left.

All participants commented on the need for "another way" to get the modules from the homepage. Interestingly, common among all three participants was the suggestion to created topic tabs for each topic on the navigation bar, and the designer had to explain that such customization was not yet available on Canvas. Nonetheless, once the users learned where to access the modules, they were able to complete the majority of the tasks listed on the protocol in a timely manner, and rated looking for the required information very easy for most of the questions (on a scale of 1 to 5, with 1 representing very difficult and 5 being very easy). Therefore, this issue was rated as a *major usability problem* according to Nielsen's 5-level scale, a problem that had a high priority to be fixed but was not catastrophic. Additionally, all participants pointed out that the resource site content list was not hyperlinked, which had a negative impact on the flow and ease of navigation of the entire resource site (*major usability problem*). Though users were able to perform all the tasks and locate information with relative ease, the need for clarity on module topics was also apparent, as participants had commented on changing topic titles may assist them in finding specific information. Other suggestions included to remove subtopic content "Software and Hardware Requirement" on the homepage, as users were confused between the technology requirements needed for the OTEC program versus utilizing the Canvas LMS itself (*major usability problem*). These issues were resolved, and it was evident that the

revisions made a substantial impact on the navigation and ease of use of the resource site from the second iteration of usability test. Figure 5 are images of the before and after revisions of the resource site
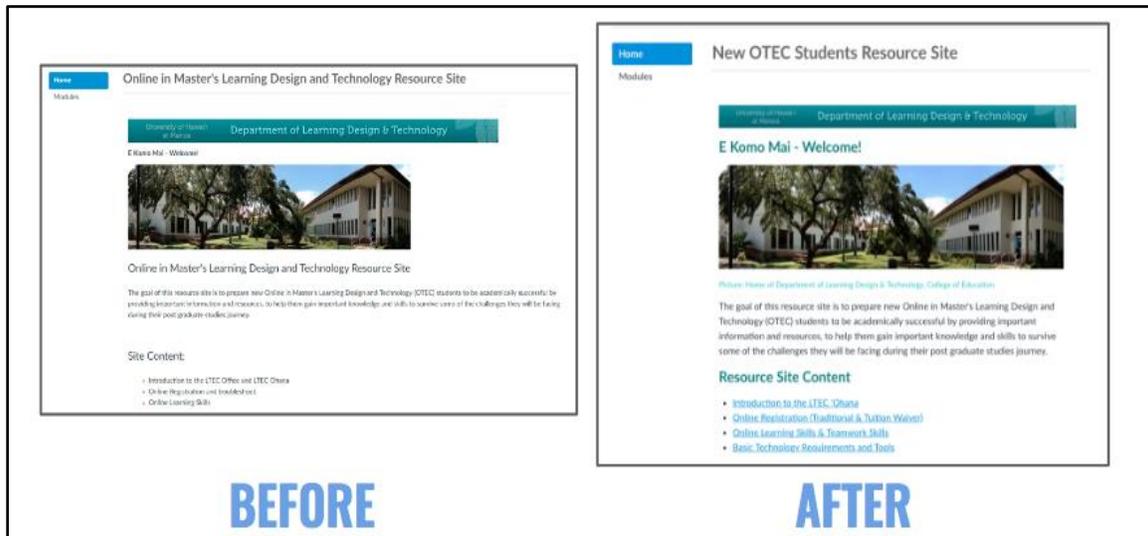

Figure 5. Screenshot of revisions from iteration one

ITERATION TWO

The second iteration of usability study involved four test users. Though some of the participants also bought up the same usability issue of having only two tabs, Home and Modules, for the navigation bar from the previous iteration, which is a limitation of Canvas, the changes made to the resource site content list on the homepage to clickable hyperlinks made a significant difference directing users to the appropriate information page in a much swifter fashion. The blue hyperlinks stood out at a focal point of the homepage, and the participants were able to perform all the tasks with 100% accuracy with less time. While the revised prototype did result in a reduced amount of navigational issues, it was fascinating that participants turned their focus on design errors and the perceived usefulness of the web content. In the area of design and layout, one participant suggested to increase the dimensions of the embedded videos, and instead of having the titles of the videos and links listed separately, she recommended making video titles into hyperlinks which made the layout uncluttered and pleasant to look at (*minor usability problem)*. Figure 6 illustrates the before and after of the suggested revision.

Figure 6. Screenshot of revisions from iteration two

Another suggestion was to increase the font size to highlight important information to reduce search time (*minor usability problem*). Two graphics were also replaced, as one was identified as duplicated use in two separate pages, and one picture was deemed not obviously relevant to the topic (*minor usability problem*). One participant also brought up that the two diacritical markings 'okina and kahako used in Hawaiian language were not included in the website (*minor usability problem*). Though is it common practice and acceptable to not include any diacritical markings, the participant suggested that using 'Okina and kahako consistently throughout the website can ensure the true meaning of the words selected is conveyed, as well as acknowledging that our program was founded in a special place Hawai'i. In the area of usefulness, participants reflected that though they are happy to have found information of faculty and staff profiles, the information about faculty did not stand out and the layout of the staff profile was not attractive. The designer considers this a *major usability problem* as this error may demotivate users in engaging with this piece of content. To rectify this issue, the faculty and staff profiles were regrouped and reorganized in a way that was more eye catching (see Figure 7). Additionally, some commented that information about the LTEC department should have priority over the information about College of Education (COE), as this is a department specific website, therefore suggested that COE content be relocated to the bottom of the page (*major usability problem*).
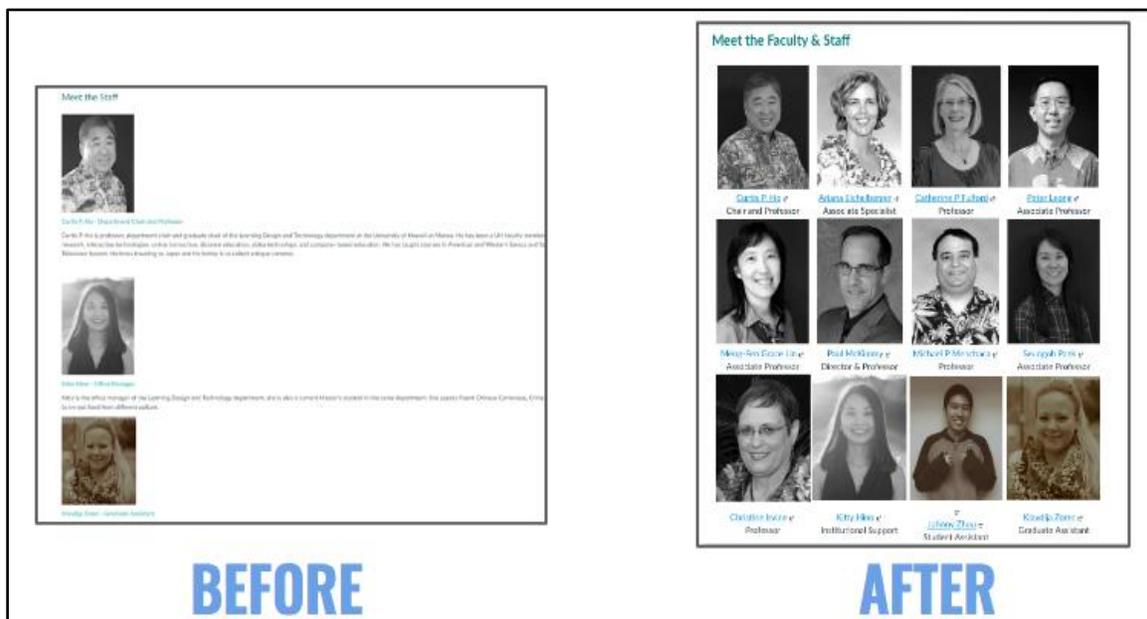

Figure 7. Screenshot of revisions from iteration two

ITERATION THREE

Three test users participated in the third round of usability testing. Contrary to expectation, there were more major usability issues and changes identified at this stage of the study, though it is important to point out that one participant had extensive experience as a web designer, thus provided various critical yet beneficial comments to further improve the resource site. Two suggestions were made to improve the area of design. One was considered a *major usability problem*, as the participants found the graphics loading time to be too long, quoting Steve Krug's (2010) lesson "Don't waste my time - much of our web use is motivated by the desire to save time. As a result, web users tend to act like sharks. They have to keep moving or they'll die". Noting that waiting "even one second is too long". As a result, all images dimensions were made smaller to reduce loading time. In the area of navigation, participants appreciated the social media icons which helped locate information about the department's social network. However, it was suggested to make the icons clickable as well to enhance ease of use (see Figure 8) and add icons to the other LTEC affiliated group links for consistency (*minor usability problem*). Users also questioned the inclusion of some content, mainly the benefits listed at the top of each topic page. They feel that these did not add to the content and took away the focus from the "meat", the important information the designer intends to present (*major usability problem*).

Figure 8. Screenshot of revisions from iteration three

Table 2.

Post questionnaire user ratings

Usability Questions	Mean Score		
Design and Layout	**Iteration 1**	**Iteration 2**	**Iteration 3**
D1. The webpages are easy to understand	4.33	4.50	4.67
D2. The text on the site is clear and easy to read.	4.67	5.00	5.00
D3. The graphics assist in understanding of the information.	3.67	3.75	4.33
D4. The website itself is visually appealing.	3.67	4.50	5.00
D5. The organization of the site is logical and easy to follow.	3.67	4.00	4.67
Navigation			
N1. The website was easy to navigate.	4.00	4.50	4.67
N2. The theme and structure of the pages are consistent.	4.33	4.75	5.00
N3. The labels for buttons or pages are clear and concise.	4.33	4.25	4.67
Usefulness			
U1. The site is useful for learning the information.	4.33	4.75	5.00
U2. The site would positively contribute to my program experience.	4.67	4.50	5.00
U3. I would use the resource site if it were available to me.	4.33	4.25	5.00
U4. I would refer to the resource throughout my academic journey with LTEC.	4.00	4.00	4.67

They felt similarly towards the information about College of Education, which was also mentioned and moved to the bottom of the page during iteration two. These contents were ultimately removed to make the resource site content more to the point. It is apparent over the course of three rounds of testing that as usability problems decreased, users' overall impression of the design and layout, navigation and usefulness of the resource site improved. Table 2 demonstrates the increase in ratings in all of the areas of usability as the prototype progressed through each iterations of usability study.

DISCUSSION AND CONCLUSION

This project was a usability study that involved developing and evaluating an online orientation and resource site for students enrolled in the online Master of Learning Design and Technology program. The intent of creating a web-based platform was to give students a better idea of resources and procedures they need to follow each semester to navigate their academic journey successfully, alleviate disorientation and frustrations. The other goal was to assist them in connecting with their faculty, peers and alumni.

Gaining feedback and user insights were crucial to the design and development of the resource site. The usability study aimed to answer three research questions, the first question addressed the design and ease of use of the online resource site, the second question examined the ease of navigation, and third being the perceived usefulness of the information provided by the online resource site. The results through the "think out loud" interview process and the post-study questionnaire indicated that participants agreed that the design of the resource site was attractive, user friendly and navigable. Changes were implemented to improve the resource site's overall design and usability based on user feedback and rapid prototyping. Result data suggested that each iteration of testing and modifications improves users' perception on the design layout and the efficiency of the resource site.

Revisions included relocating information or deleting redundant information for simplification, relabeling for clarification, strategically placing additional links for improved navigation, and changing graphics, font sizes and colors to help direct user attention to important information, increasing ease of use of the resource site. Considering the effectiveness of usability testing for evaluating websites such as this resource site, the designer will continue to gather usability data from actual target audience, further expand on the site content, and strive to create an online resource hub for students, in order to provide better learning experience and increase student satisfaction during their journey through the LTEC online program.

REFERENCES

Bergstrom, J. (2013). *Moderating Usability Tests*. [Web log comment]. Retrieved from http://www.usability.gov/get-involved/blog/2013/04/moderating-usability-tests.html

Boening, C. H., & Miller, M. T. (2005). New student orientation programs promoting diversity. *The community college enterprise*, 11(2), 41. Retrieved from http://www.schoolcraft.edu/pdfs/cce/11.2.41-50.pdf

Bozarth, J., Chapman, D. D., & LaMonica, L. (2004). Preparing for Distance Learning: Designing An Online Student Orientation Course. *Educational Technology & Society*, 7 (1), 87-106. Retrieved from http://www.ifets.info/journals/7_1/10.pdf

Gold, S. (2013). A constructivist approach to online training for online teachers. *Journal of Asynchronous Learning Networks*, Volume 17 Issue 1, p.43 – 45. Retrieved from https://www.mnsu.edu/cetl/teachingwithtechnology/tech_resources_pdf/A%20Constructivist%20Approach%20to%20Online%20Learning.pdf

Guo, P. J., Kim, J., & Rubin, R. (2014). How video production affects student engagement: An empirical study of mooc videos. In *Proceedings of the first ACM conference on Learning@ scale conference* (pp. 41-50). ACM. Retrieved from https://dl-acm-org.eres.library.manoa.hawaii.edu/citation.cfm?doid=2556325.2566239

Jones, K. R. (2013). Developing and implementing a mandatory online student orientation. *Journal of Asynchronous Learning Networks*, 17(1), 43-45. Retrieved from http://www.anitacrawley.net/Resources/Developing_and_Implementing_a_Mandatory_Online_Student_Orientation.pdf

Krug, Steve. (2010). *Rocket Surgery Made Easy: The Do-It-Yourself Guide to Finding and Fixing Usability Problems*. Berkeley, California. New Riders.

Lehmann, T., Hähnlein, I., & Ifenthaler, D. (2014). Cognitive, metacognitive and motivational perspectives on preflection in self-regulated online learning. *Computers in Human Behavior*, 32, 313–323.

Liu, J. C., & Adams, A. (2017). Design of Online Student Orientation with Conceptual and Procedural Scaffolding. *In Learning and Knowledge Analytics in Open Education* (pp. 41-68). Springer International Publishing. Print.

Menchaca, M. (2014). Mi CASA Es Su Casa E-Learning: A Simplified Approach to Designing Online Learning. Retrieved from https://dcdc.coe.hawaii.edu/ltec/612/

wp-content/uploads/2014/05/menchaca_casa.pdf

McDonald, S., Edwards, H. M., & Zhao, T. (2012). Exploring think-alouds in usability testing: An international survey. *IEEE Transactions on Professional Communication, 55*(1), 2–19.

Nielsen, J. (1995). Severity ratings for usability problems (1995). *Papers and Essays* 54 (1995):1-2.

Shackel, B. (2009). Usability-Context, framework, definition, design and evaluation. *In Interacting with computers*, 21(5-6). 399-346.

Wang, H. C., & Chiu, Y. F. (2011). Assessing e-learning 2.0 system success. *Computers & Education*, 57(2), 1790-1800. Retrieved from http://web.a.ebscohost.com.eres. library.manoa.hawaii.edu/ehost/pdfviewer/pdfviewer?vid=1&sid=dbe52f04-5df0-41a5-b15e-7d8323a612bc%40sessionmgr4008

Zhang, P., Small, R. V., Von Dran, G. M., & Barcellos, S. (2000, January). A two factor theory for website design. In *System Sciences, 2000. Proceedings of the 33rd Annual Hawaii International Conference on* (pp. 10-pp). IEEE.