Development & Usability of an Online Resource for Prospective Dental Hygiene Practitioners

Pamela M. Terrado
University of Hawai‘i at Mānoa
Honolulu, Hawai‘i
United States
pterrado@hawaii.edu

Prototype 1 (Original): http://uhdentalhygiene.wixsite.com/prototype1
Prototype 2: http://uhdentalhygiene.wixsite.com/prototype2
Prototype 3: http://uhdentalhygiene.wixsite.com/prototype3

Abstract: Dental hygienists are licensed professionals that work closely with the dentist and staff to meet the oral health needs of an individual. Like graduates from other professions, new dental hygiene (DH) graduates often encounter a transitional gap from school to the work environment. Utilizing both minimalist and user-centered design approaches, a website was developed to assist DH students transition smoothly to become licensed professionals. To evaluate website’s utility, a usability research study was conducted to eight DH students at the University of Hawai‘i at Mānoa: School of Nursing and Dental Hygiene (UHM: SONDH). The purpose of the study was to evaluate the functionality and value of the website Dental Hygiene: Student to Professional Transition. Rapid prototyping, in conjunction with Heuristic Evaluation and “Do-it-yourself” usability testing, was implemented throughout the study. In the study, five areas of inquiries (user navigation efficacy, task performance efficiency, and website design, content and performance satisfaction) were investigated. Data analysis revealed predominantly favorable response from the study participants; however, close data examination revealed inadequacy in the informational content provided within the website.

Introduction

As an adjunct clinical lecturer at UHM: SONDH, it is not uncommon for senior DH students to ask faculty for advice regarding expectations after school. For some of these students, the transition from a controlled classroom and clinical setting to a private or public practice can be challenging. Current dental hygiene graduates are not appropriately prepared for the transition from student to practitioner (Taylor, 2011). Newcomers in the field may feel a lack of confidence in practicing dental hygiene due to their inexperience with working alongside seasoned dental professionals, and in gaining patient rapport. To fulfill the Code of Ethics in Dental Hygiene, it is imperative for dental hygienists to practice confidently and competently. As DH students approach graduation and begin their careers as licensed professionals, it is necessary to ensure that they are confident in implementing all parts of the DH process of care (Simonian et al., 2015).
Resources about what to expect after DH school are available on the internet; however, a one-stop resource that collates essential materials and information dedicated to prospective dental hygienists in Hawai‘i does not exist. As an aspiring DH educator, I aim to develop a resource website dedicated to support Hawai‘i’s future dental hygienists as they transition to become professionals. I chose to create a website because it is one of the most powerful tools for communication in the twenty-first century. The overall goal of this website was to provide a resource for DH practitioners that will assist in building their confidence in practicing outside of a controlled environment.

Regardless of the type of the site, in virtually every case, a website is a self-service product; there is no instruction manual to read beforehand, no training seminar to attend, no customer service representative to help guide the users through the site (Farinetti, 2016). Therefore, a usability research study was conducted to identify website discrepancies. The purpose of the study was to evaluate the functionality and value of the website developed as a resource to support senior DH students from UHM: SONDH as they transition to become licensed professionals.

**Literature Review**

Due to limited literature resources written for prospective DH practitioners transitioning to their profession, literature for new graduate nurses that are applicable to DH students were utilized. New graduate nurses’ transition into practice is a stressful period during which novice nurses are particularly vulnerable to burnout and its negative effects, including job and career dissatisfaction and turnover (Spence Laschinger et al., 2016). Similarly, current DH graduates are not prepared for the transition, and most reported not having the knowledge or the skills at entry-level to apply for jobs in public health or in specialty practices (Taylor, 2011). Without supportive relationships, novice registered nurses (and dental hygienists) who care for complex patients often feel overwhelmed and exhausted, and they may suffer from significant anxiety (Hofler & Thomas, 2016). Having confidence at the beginning of their career benefits in developing an active and effective dental disposition, and the ability to establish positive patient rapport.

From Taylor’s investigation, during the transition to practice, participants reported using several methods to address deficiencies in knowledge and skill such as non-formal mentoring, self-study, study clubs, and postgraduate courses (2011). As a subject matter expert that has been practicing DH for over four years in private, public and educational environments, I have observed that prospective practitioners would opt for self-study to address any shortfalls. By implementing self-study, these future practitioners engage in a self-directed learning (SDL). SDL is a process by which learners manage their own learning process (Boyer et al., 2014). Self-directed learners are better prepared as employees to anticipate their organization’s needs, tailor their learning to meet their own unique styles, and acquire the necessary skills, knowledge, and abilities to create value for their customers, employers, and organizations (Boyer et al., 2014). To meet the SDL needs of the DH students transitioning to practice, a resource website was developed. The concepts utilized for the created website were focused on both minimalist and user-centered design approach. “Good design is as little design as possible” (Dieter Rams), a minimalist style is the most effective way to achieve a solid, long-lasting design that relies on very little
supporting design (McNeil, 2014). Additionally, the user-centered design approach emphasizes on user-experience rather than the technology. The product is not an end in itself: it is a means toward the end of providing a good experience for the user (Farinetti, 2016). The design and development process, involved rapid prototyping simultaneously conducted with a usability research study. Rapid prototyping is an iteration cycle where evaluation is done throughout the process to catch problems early in the development stages (Camm, 2012). Moreover, usability as defined by the International Organization of Standardization (ISO) — an independent, non-governmental organization that develop standards that provide requirements, specifications, guidelines or characteristics that can be used consistently to ensure that materials, products and services are fit for their purpose — as the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use (ISO, n.d.). Its goal is to identify any usability problems, collect qualitative and quantitative data, and determine the participant’s user satisfaction with the product (U.S. Department of Health and Human Services, 2013).

**Website Design**

In addition to meeting the SDL needs of the prospective DH practitioners, another rationale for creating a website was the increasing population of millennials — individuals born in 1981 to 1997 (Pew Research Center, 2015) — in the field of dentistry. These millennials are known to be tech savvy and sociable (both online and in real life); thus, the development of a resource website was deemed suitable for this type of audience.

A web development platform called Wix.com was utilized to create the website *Dental Hygiene: Student to Professional Transition*. Wix was selected because it is a user-friendly website builder that enables anyone to create remarkable web designs free of charge. It has an array of pre-made layouts that are easily customizable, enable text and picture animation, and effortless video and direct resource link attachment.

The created website featured a marble background theme with a minimalist design to reflect simplicity, elegance and professionalism (Figure 1). One of the benefits of a minimalist design is that it reduces clutter which allows the content to stand out and produce a design that is very easy to consume (McNeil, 2008). With this design approach, user ease of navigation can be achieved.
Content materials included in the website were “need-to-know” topics that I selected based on my personal experiences as a newly licensed registered dental hygienist. Once the main topics were identified, extensive research was conducted resulting in the addition of subtopics (Figure 2) — which were featured as a dropdown list from the horizontal menu to provide the users with multiple website pathways.

Another feature incorporated in the website was a looping picture gallery to establish dynamic appeal and retain audience attention (Figure 3). Images in the gallery were selected based on their relevance to the website’s theme — DH students transitioning to become licensed professionals. A picture is worth a thousand words, and when it comes to capturing your
audience’s attention, you want to take full advantage of every chance to communicate your message (More, 2014).

**Figure 3.** Representation of pictures alternating in the picture gallery.

### Methodology

**Research questions (RQ).** The questions formulated for the study were based on the ISO’s definition of usability. There are three primary attributes that comprise usability: effectiveness (proportion of successfully completed tasks), efficiency (time spent to complete tasks), and satisfaction (attitudes toward using the system) (Zazelenchuk, 2008). The following questions were designed to investigate user navigation efficacy, task performance efficiency and website design, content and performance satisfaction:

- **RQ1.** How successful are the participants in effectively navigating the website to find information?
- **RQ2.** How fast does it take for the participants to efficiently perform tasks the first time they use the website?
- **RQ3.** How satisfied are the participants in the website’s design, content and performance?

**Participants.** The usability research study involved two types of participants; one group for heuristic evaluation and another for the “do-it-yourself” usability testing.

Two of my peers were asked to conduct heuristic evaluations using the Heuristic Evaluation Form (see Appendix A) to identify deficiencies on the initial website (see Appendix B), and usability study procedures. These peers were graduate students from UHM: Learning Design and Technology program; both of which are experienced in providing heuristic evaluation feedback. The heuristic evaluation method was chosen because it’s been widely used due to its low-cost and easy application, and it is classified as ‘evaluation through expert analysis,’ it is not conducted by the actual users (Ssemugabi, 2010). Additionally, it allowed for a small set of evaluators to examine the interface and judge its compliance with recognized usability principles (Nielsen, 1995).
Participants for the “do-it-yourself” usability testing were senior DH students in transition to become licensed practitioners. The purpose of the “do-it-yourself” usability study method was to gain insights that enables the webmaster to improve what he/she is building (Krug, 2009). UHM: SONDH was the only program that offered a baccalaureate degree in DH on the island of O‘ahu; therefore, senior students from this university were selected by default. A total of nineteen prospective participants (1 male, 18 females) with varied age, ethnicity, occupational background, web experience, and computer knowledge/skills were recruited for the study. Eight students (all females) volunteered to participate in the study with the largest group (50%) belonging in the 23 to 27 age category. Majority of the participants (75%) reported having work experience in the dental field. Table 1 provides a complete illustration of participant demographics.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-22</td>
<td>2</td>
<td>25%</td>
</tr>
<tr>
<td>23-27</td>
<td>4</td>
<td>50%</td>
</tr>
<tr>
<td>28-32</td>
<td>2</td>
<td>25%</td>
</tr>
<tr>
<td>33+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work experience in the dental field</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>6</td>
<td>75%</td>
</tr>
<tr>
<td>No</td>
<td>2</td>
<td>25%</td>
</tr>
</tbody>
</table>

Of the six participants that reported work experience in the dental field, two individuals worked for at least a year, three individuals for two to three years, and one individual worked for six years or more. With the majority (67%) having work experience as dental assistants (Table 2).

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Years</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-1 year</td>
<td>2</td>
<td>33%</td>
</tr>
<tr>
<td>2-3 years</td>
<td>3</td>
<td>50%</td>
</tr>
<tr>
<td>4-5 years</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>6+ year</td>
<td>1</td>
<td>17%</td>
</tr>
<tr>
<td>Position</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dental Assistant</td>
<td>4</td>
<td>67%</td>
</tr>
<tr>
<td>Receptionist</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Hygiene Assistant</td>
<td>2</td>
<td>33%</td>
</tr>
<tr>
<td>Financial Coordinator</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>
Upon close examination, Table 1 revealed that all the participants belong in the Millennial Generation. Millennials are now the largest labor workforce with a total of 53.5 million individuals ages 18 to 34 in 2015 (Pew Research Center, 2015) and are more likely to say that technology makes life easier (Pew Research, 2010). This finding supports one of the rationale for the development of a resource website.

**Procedures.** Once the Institutional Review Board (IRB) approval was received, an Access Letter (see Appendix C) that formally requested permission to conduct a usability research study with senior DH students and acquire their hawaii.edu email addresses was mailed to the UHM: SONDH Department Chair. Upon the Department Chair’s permission, a Recruitment Email (see Appendix D) was sent to the nineteen prospective participants. Nielsen and Krug argued that a smaller participant pool lets you find almost as many usability problems as you’d find using many more test participants (Nielsen, 2013), and that the first three users are very likely to encounter many of the most significant problems related to the task being tested (Krug, 2009). Therefore, at least four individuals were desired to participate for each of the two usability rounds. To do this, the first eight students that replied to the recruitment email were selected for the study. A Confirmation Email (see Appendix E) with an attached Consent and Recording Release Form (see Appendix F) and the Scenarios and Task Sheet (see Appendix G) were sent to the eight participants prior to each of their scheduled usability study session.

After the eight participants has been selected, they were divided into two groups of four for Round one and Round two respectively. Each round consisted of four separate in-person usability testing sessions. The sessions were conducted at the UHM Administrative Services Building 2. A laptop with a screen and audio recording tool (QuickTime Player) was provided for convenience purposes, and to record each of the participant’s screen and audio activities. A modified version of Steve Krug’s usability script (see Appendix H) was utilized to facilitate the study — which proceeded in the following sequence:

1) Introduction.
2) Pre-Study Interview (see Appendix I).
3) Scenarios/task portion.
4) Post-Study Interview (see Appendix J).
5) Conclusion.

Furthermore, a Concurrent Think Aloud (CTA) moderating technique was implemented throughout the study to allow the moderator to understand participants’ thoughts as they occur and as they attempt to work through the issues they encounter (Bergstrom, 2013). Guided by the ISO’s definition of usability, tasks (see Appendix G) and data collection materials (see Appendix J, and Appendix K) were aligned to collect quantitative and qualitative data on the website’s effectiveness, efficiency, and user satisfaction. As part of the rapid prototyping process, data gathered from the first round of the study were utilized for website revisions in preparation for the second iteration cycle.

**Results and Data Analysis**

Prior to implementing the usability study, heuristic evaluations by peers provided critical feedback for the immediate revisions to the categories Statute/Rule Chapter and Job Search of Prototype 1. Notable discrepancies (see Appendix L) include:
● An excessive number of subtopics (which could be accessed via the drop-down list or embedded internal links) in the category *Statute/Rule Chapter*.
● A *Job Search* category that lacked content.

To enhance these categories, the following revisions were made (see Appendix M):
● The category title *Statute/Rule Chapter* was replaced by *Licensure* to focus informational contents on DH license application.
● As a design factor a translucent State of Hawai’i seal background was featured on the newly created *Licensure* category.
● The subtopics *Documents* and *Interview* were added as supplementary informational contents to the *Job Search* category.

**Round one.** Initial user perceptions by participants for Prototype 2 were 100% positive. All four participants quickly identified the purpose and target audience of the website, and all thought that the website was presented professionally — the theme looked simple and clean, the images were appropriate, and the font sizes and colors were easy to read. Additionally, the participants also thought that the horizontal menu and its drop-down list were relevant and helpful in finding information throughout the website.

<table>
<thead>
<tr>
<th>Participant</th>
<th>Task 1</th>
<th>Task 2</th>
<th>Task 3</th>
<th>Task 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Pass</td>
<td>Pass</td>
<td>Pass</td>
<td>Pass</td>
</tr>
<tr>
<td>B</td>
<td>Pass</td>
<td>Pass</td>
<td>Pass</td>
<td>Pass</td>
</tr>
<tr>
<td>C</td>
<td>Fail</td>
<td>Fail</td>
<td>Fail</td>
<td>Pass</td>
</tr>
<tr>
<td>D</td>
<td>Pass</td>
<td>Pass</td>
<td>Pass</td>
<td>Pass</td>
</tr>
</tbody>
</table>

*Note: Sixteen total task performances. Three failed attempts.*

A total of 16 task performances were observed, of those, 13 were successful. Despite the 100% positive perception feedback on Prototype 2, the success rate (efficacy) on website navigation was only 81.25% (13/16 = .8125 x 100). In reference to Table 3, if we divide the total number of failed attempts (3) by the total number of performances (16), it could be determined that there was an 18.75% failure rate in task completion — specifically on Tasks 1 (finding information about license application), Task 2 (finding information about the four clinical examination accepted in the State of Hawaii), and Task 3 (finding information explaining what CDT Code is). Therefore, it could be assumed that Prototype 2 had navigational discrepancies on the topics licensure and CDT codes.
Table 4. *Speed in Task Completion for Prototype 2.*

<table>
<thead>
<tr>
<th>Participant</th>
<th>Task 1</th>
<th>Task 2</th>
<th>Task 3</th>
<th>Task 4</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>20 secs.</td>
<td>45 secs.</td>
<td>30 secs.</td>
<td>23 secs.</td>
<td>1 min. 58 secs.</td>
</tr>
<tr>
<td>B</td>
<td>46 secs.</td>
<td>15 secs.</td>
<td>1 min. 4 secs.</td>
<td>23 secs.</td>
<td>2 mins. 28 secs.</td>
</tr>
<tr>
<td>D</td>
<td>1 min. 5 secs.</td>
<td>1 min. 24 secs.</td>
<td>28 secs.</td>
<td>26 secs.</td>
<td>3 mins. 23 secs.</td>
</tr>
</tbody>
</table>

*Note:* Total in minutes rounded to the nearest hundredths; *failed attempts.*

In Table 4, four participants worked with Prototype 2 to complete four tasks. Participants A, B and D completed all the tasks given — taking 1 min. 58 secs., 2 mins. 28 secs., and 3 minutes. 23 secs. respectively, while Participant C failed to complete Task 1, Task 2, and Task 3 yet managed to complete Task 4. The time before intervention on Task 1 was 1 min. 11 secs., Task 2 was 2 mins. 19 secs., and Task 3 was 49 secs., while Task 4 completion time was 21 secs. Guided by the sample equation (see Appendix N) found in Misfud’s blog *Usability Metrics - A Guide To Quantify The Usability Of Any System* (2015), a time based efficiency was determined.

In order to properly solve for time based efficiency, the total values from the Speed in Task Completion Table were converted to reflect the same units (i.e. minutes). For example: 1 min. 58 secs. was converted into 1.97 mins. To calculate, the first step would be to determine the total score of successful and failed tasks performed by each of the participants — in this equation, a successful task was given the score one, while a failed task was given the score zero. For example: Participant A received a total score of four for completing all four tasks; while Participant C received a total score of one for completing only one task. The second step would be to divide these scores by the total speed (time) of completed attempts. For example: Participant A equals $4 / 1.97 = 2.03$; while Participant C equals $1 / 0.35 = 2.86$. The third step would be to add all the quotients, and lastly, the sum from step three would be divided by the product of the total number of participants and the total number of tasks. After calculation (see Figure 4) a time based efficiency of 0.48 tasks/minute was measured. The calculation showed that in theory, a user from Round one can efficiently complete approximately two of the four tasks in one minute using Prototype 2.
Individual post-study interviews conducted after each session were utilized to provide data on website satisfaction. When the participants were asked to grade the website (where “A” was exemplary and “F” was catastrophic; see Appendix J), three participants gave the website an “A” grade, while one participant gave it a “B,” which determined that participants in round one responded with a 75% favorable response regarding website satisfaction. They found the website to be user-friendly, easy to use, and convenient. However, a few of the participants struggled to find the information about license application. For example: one of the participant responded, “make it easier to find the four regional clinical examinations;” while another said, “add testing requirements for different States.” Therefore, it was determined that there were shortfalls in the navigational and informational aspect of the licensure page in Prototype 2.

To address the shortfalls and to further enhance website satisfaction, Prototype 3 was created. In the development process, I made a personal decision to shorten the original website title from Student to Professional Transition — An Online Source for Prospective Dental Hygiene Practitioners to Dental Hygiene: Student to Professional Transition because I felt that the title was lengthy. Additionally, it was noted from observation that embedded internal links were underused, and the drop-down list caused confusion to some; therefore, to encourage usability study Round two participants to use the internal links, the drop-down lists were removed (see Appendix O). Moreover, other revisions (see Appendix P) include the following:

- The State of Hawaii seal was positioned on the upper right corner (instead of it being a translucent background; Appendix M) of the Licensure category to inform the users of the State that it's intended for;
- A “Click here to continue” internal link was embedded at the bottom of Licensure page one to direct users to the next page where;

\[
\text{Step 1 and 2} = \frac{4}{1.97} + \frac{4}{2.47} + \frac{1}{0.35} + \frac{4}{3.38} \\
\times 4
\]

\[
\text{Step 3} = \frac{2.03 + 1.62 + 2.86 + 1.18}{16}
\]

\[
\text{Step 4} = \frac{7.69}{16}
\]

\[
\text{Time Based Efficiency} = 0.48 \text{ task/minute}
\]
● Information about the four regional clinical examinations were moved at the top of Licensure page two for ease of visibility;
● An external link for additional information about clinical examination accepted on other States was included within page two of the Licensure category.

Round two. Participants for this usability round expressed the same reaction as the participants from the first round of the study. They could positively identify the purpose and intended audience for the website. Similarly, all thought that the website was professionally made — the overall layout looked neat and simple, the pictures were well chosen, and the font sizes and colors matched the theme. However, although most participants thought that the horizontal navigation bar looked appropriate and self-explanatory, one of the participants commented, “I kinda expected a drop-down because it’s how it usually is on typical websites.”

Table 5. Success Rate for Prototype 3.

<table>
<thead>
<tr>
<th>Participant</th>
<th>Task 1</th>
<th>Task 2</th>
<th>Task 3</th>
<th>Task 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>E</td>
<td>Pass</td>
<td>Pass</td>
<td>Pass</td>
<td>Pass</td>
</tr>
<tr>
<td>F</td>
<td>Pass</td>
<td>Pass</td>
<td>Pass</td>
<td>Pass</td>
</tr>
<tr>
<td>G</td>
<td>Pass</td>
<td>Pass</td>
<td>Pass</td>
<td>Pass</td>
</tr>
<tr>
<td>H</td>
<td>Pass</td>
<td>Pass</td>
<td>Pass</td>
<td>Pass</td>
</tr>
</tbody>
</table>

Note: Sixteen total task performances. All task completed successfully.

Like Round one, a total of 16 task performances were observed, all of them of which were accomplished successfully. Participants in round two navigated through the website with a 100% efficacy rate (see Table 5). However, some of the participants pointed out that the direction for Task 1 (finding information about license application) was vague. As a result, three of the participants took over a minute to complete Task 1 (see Table 6).

Table 6. Speed in Task Completion for Prototype 3.

<table>
<thead>
<tr>
<th>Task 1</th>
<th>Task 2</th>
<th>Task 3</th>
<th>Task 4</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant E</td>
<td>1 min. 13 secs.</td>
<td>42 secs.</td>
<td>15 secs.</td>
<td>1 min. 29 secs.</td>
</tr>
<tr>
<td>Participant F</td>
<td>1 min. 38 secs.</td>
<td>25 secs.</td>
<td>24 secs.</td>
<td>25 secs.</td>
</tr>
<tr>
<td>Participant G</td>
<td>35 secs.</td>
<td>45 secs.</td>
<td>12 secs.</td>
<td>30 secs.</td>
</tr>
<tr>
<td>Participant H</td>
<td>1 min. 32 secs.</td>
<td>10 secs.</td>
<td>41 secs.</td>
<td>14 secs.</td>
</tr>
</tbody>
</table>

Note: Total in minutes rounded to the nearest hundredths.

Using the integers from Table 6, the same equation (see Appendix N or Figure 4) was applied to determine the time based efficiency for Round two. Four participants worked with Prototype 3 to complete the same four tasks (see Appendix G). Participants E, F, G and H completed all the tasks given — taking 3 mins. 39 secs., 2 mins. 52 secs., 2 mins. 2 secs., and 2 mins. 37 secs. respectively. After calculation (see Figure 5), a time-based efficiency of 0.37 tasks/minute was
measured. Again, in theory, we can assume that a user from Round two can efficiently complete one and partially complete another of the four tasks in one minute using Prototype 3.

\[
\text{Step 1 and 2} = \left( \frac{4}{3.65} + \frac{4}{2.87} + \frac{4}{2.03} + \frac{4}{2.62} \right) \times 4
\]

\[
\text{Step 3} = \frac{(1.10 + 1.39 + 1.97 + 1.53)}{16}
\]

\[
\text{Step 4} = \frac{5.99}{16}
\]

\[
\text{Time Based Efficiency} = 0.37 \text{ task/minute}
\]

*Legend:
- **Green** = total score of successful tasks performed by each participant.
- **Yellow** = total speed of successful attempts.
- **Teal** = total number of participants.
- **Pink** = total number of tasks to be completed.

**Figure 5. Time Based Efficiency Calculation for Prototype 3**

In summary, website satisfaction for Prototype 3 was also favorable. All felt that the website would be of service to them in their transition to become licensed dental hygienists. The participants found the website to be straightforward, well-constructed, and easy to use and navigate. However, like Round one, three participants gave the website an “A” grade, while one participant gave it a “B” grade. This participant commented, “I would like to see more color/graphics,” and “little improvements such as making the page stand out by staying away from a white background would help better the website.” It was also noted that few of the participants wanted additional information on different clinical licensing examinations, and an actual license application form to view.

**Discussion and Conclusion**

The purpose of the usability research study was to evaluate the functionality and value of the website (*Dental Hygiene: Student to Professional Transition*) developed to assist DH students from UHM: SONDH in their transition to become licensed professionals. Three research questions were formulated to investigate user navigation efficacy, task performance efficiency, and website design, content and performance satisfaction. Based on the results from Round one and Round two, it can be concluded that the website was functional. However, it was determined that further iterations are needed to gauge the website’s overall value.

Conclusions apparent after Round one included: internal links that were underused, and poorly
labeled horizontal navigation bar. All participants in this usability round did not bother to click on any of the internal links embedded within the web pages (see Appendix O). This usability issue may be caused by poor color choice to indicate that the word(s) were “linked” to other web pages, or the drop-down list may have diverted their attention to overlook these links. Another issue was the poorly labeled navigation bar (e.g. “Licensure 2” and “CDT Codes”). Both labels were non-descriptive and unfamiliar to the participants which could have resulted in the failed task completion (see Table 4).

In summary, findings from Round two included: poorly constructed usability study tasks, and lack of website informational content. As an outcome of Round one usability testing, a significant change was the elimination of the drop-down list because it was assumed (through Round one data analysis) that the navigation failure was due to the excessive pathways provided for the participants to use in locating information. However, upon further evaluation, it was determined that the usability tasks given to the participants were vaguely written. For example: Task 1 asked for, “Using this website, where would you go to find information about license application?” In this task, the participants were quick to click on Licensure in the navigation menu; however, majority of them hesitated to state that they’ve completed the task because they were unsure whether the task was asking for general licensure requirements (i.e. age, DH school credentials, proof that applicant passed the National Board Examination, etc.) or an actual license application form. The other issue that was brought up was the lack of informational content. For example (regarding information about dental implants): one of the participant mentioned, “I was expecting more information about the cost, pros/cons, and limitations of dental implants for me to fully use this page to educate my patient.” Therefore, the aforementioned appraisals could have resulted in the low rating level of the website’s value.

At one point in our lives, we have experienced the anxiety of leaving the school environment and transition into workforce. This website resource was built to help bridge the translational gap that DH students encounter when they transition as professionals. Furthermore, the field of DH is continually evolving with the development of new technologies and processes — which adds to the importance of a web resource that can provide up-to-date information regarding current trends in the field. In summary, this usability study demonstrated reasonable functionality in the areas of efficacy and efficiency. Although the website satisfaction was low, the study revealed potential improvements necessary to achieve the goal of providing prospective dental hygienist with a valuable one-stop web based resource that can assist them in building their confidence in practicing outside of a controlled environment.

The usability study conducted for the resource website *Dental Hygiene: Student to Professional Transition* validated the need for a one-stop resource for future registered dental hygienists in Hawai‘i. One participant stated, “Instead of searching Google and having to go through multiple links regarding Hawai‘i’s requirements to become a licensed DH, I am able to get all of the information I need in one website”; while another commented “It’s nice to see all this relevant information in one place.” With these feedbacks in mind, the next steps would be to continue website refinement, further usability iteration cycles, and website installation and maintenance. Furthermore, a possible upgrade would be to modify the website to integrate mobile accessibility to address the “just-in-time” learning needs of the growing population of millennials in dentistry.
References


Appendix A
Heuristic Evaluation Form


Heuristics evaluation is a usability approach that helps to identify and measure issues with user interface and content design. It is an informal approach allowing for evaluation in many settings. Today, you will use a Heuristic approach in providing feedback to a functional prototype. The goal is to give an overall indication of the strength of the prototype as well as any specific feedback about design issues. Design is a critical process and as such keep in mind that even the best designs require redesign and improvement.

See the principles and scale below. For each principle, indicate your choice for how the design performed according to the scale. In addition, provide specific feedback if any usability issues that are identified (provide comments about specific items needing to be addressed for anything scoring 2 or higher).

Severity Rating Scale
0: No specific usability problem identified
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

<table>
<thead>
<tr>
<th>Heuristic Evaluation Form (required)</th>
<th>Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. <strong>Speak the user's' language.</strong> Use words, phrases, and concepts familiar to the user. Present information in a natural and logical order.</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>2. <strong>Consistency.</strong> Indicate similar concepts through identical terminology and graphics. Adhere to uniform conventions for layout, formatting, typefaces, labeling, etc.</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>3. <strong>Aesthetic and minimalist design.</strong> Create visually pleasing sites. Eliminate information which is irrelevant or distracting.</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td></td>
<td><strong>4. Chunking</strong>. Provide narrative written material that is short and does not contain excessive information in one section. Also, do not force the user to access multiple documents to complete a single thought.</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td><strong>5. Progressive levels of detail</strong>. Organize information hierarchically, with more general information appearing before more specific detail.</td>
</tr>
<tr>
<td></td>
<td><strong>6. Navigational feedback</strong>. Allow the user to determine her/his current position in the document structure. Make it easy to access all areas.</td>
</tr>
<tr>
<td></td>
<td><strong>7. Accessibility</strong>. Provide appropriate alternatives and a clear structure for supporting accessibility.</td>
</tr>
</tbody>
</table>

**COMMENTS:**
Appendix B
Prototype 1

Student to Professional Transition
An Online Source for Prospective Dental Hygiene Practitioners

Main Topics

Welcome and congrats!
You are on your way to becoming a Registered Dental Hygienist (RDH). As a newcomer in the field of dentistry you may have some interest and questions about what to expect in the working arena.

This website contains informational components that may not have been covered during your schooling. Such as the following:
Appendix C
Access Letter

Pamela Terrado
229 Valley Avenue
Wahiawa, Hawaii 96786

Mrs. Kristine Osada (Department Chair)
Department of Dental Hygiene Department
University of Hawai‘i at Mānoa
2445 Campus Road, Hemenway 200B
Honolulu, Hawaii 96822

Date:

Dear Mrs. Kristine Osada,

REQUEST FOR PERMISSION TO CONDUCT USABILITY STUDY

I am a registered Master’s student in the Department Learning Design and Technology (LTEC) Program at the University of Hawai‘i at Mānoa. My supervisor is Dr. Grace Lin.

The proposed topic of my research is: Usability Study: Student to Professional Transition — An Online Source for Prospective Dental Hygiene Practitioners.

The objective of the study is to assess and evaluate the website’s effectiveness, efficiency, and user satisfaction through participant’s assuming scenarios and performing tasks.

I am seeking your consent to allow me to conduct a usability study with the senior dental hygiene students. Your permission to conduct this study is greatly appreciated. Should you require any further information, please do not hesitate to contact me or my supervisor at our email address provided below:

Pamela Terrado (Student): pterrado@hawaii.edu
Dr. Grace Lin (Supervisor): gracelin@hawaii.edu

Please send me an email (pterrado@hawaii.edu) should you decide to grant me the permission to conduct the study.

Respectfully,
TO: Study Participants  
FROM: Pamela Terrado  
SUBJECT LINE: Invitation to participate in a Usability Study.

Aloha,
My name is Pamela Terrado. I’m a Master’s student in the Department of Learning Design and Technology (LTEC) Program at the University of Hawai’i at Mānoa (UHM). I’m conducting a usability study to improve the website that I’m developing for prospective dental hygiene practitioners in an effort to prepare them for their transition to becoming licensed professionals. I’m looking for senior dental hygiene students who may be interested in providing suggestions and feedback for improvements, changes, and in general what work and doesn’t work.

**Usability Study Overview:**
- Usability study will occur in Spring 2017.
- The study will be approximately thirty minutes.
- With your permission and consent; conversations and desktop screen activities will be recorded during the study.
- 1-2 minutes Pre-Study Interview.
- 15-25 minutes website usability study.
- 1-3 minutes Post-Study Interview.

**When?** *Participants will be scheduled on either round one or two according to availability.*
- Round one will be held from January 16 to February 3, 2017
- Round two will be held from February 13 to March 3, 2017

**Where?**
- University of Hawaii Hawaii  
  Administrative Services Building 2  
  2440 Campus Road  
  Honolulu, Hawaii 96822

**Interested in participating?**  
Please reply to this email or call me at 808-234-4275 by **FRIDAY, JANUARY 6, 2017**.  
If you have any other questions regarding the study, please contact me at pterrado@hawaii.edu.

Thank you,  
Pamela Terrado, BSDH, RDH
Appendix E
Confirmation Email

TO: Study Participants  
FROM: Pamela Terrado  
SUBJECT LINE: Usability Study Confirmation

Aloha,

I would like to thank you again for volunteering to participate in my usability study research project.

You are scheduled to meet with me on:

DATE: 
TIME: 
LOCATION: University of Hawaii Hawaii  
Administrative Services Building 2  
2440 Campus Road  
Honolulu, Hawaii 96822

I have attached a Consent & Recording Release Form for you to read and understand. I also attached the Scenarios & Tasks Sheet to give you an idea of what you will be doing during the study.

If you are unable to attend our scheduled meeting for whatever reason, please notify me as soon as possible (at least 24 hours).

Please reply to this email to confirm our scheduled meeting.

Thank you,

Pamela Terrado, BSDH, RDH
Appendix F
Consent & Recording Release Form

University of Hawai‘i
Development and Usability of
An Online Source for Prospective Dental Hygiene Practitioners

Introduction: My name is Pamela Terrado. I am a graduate student in the Department of Learning Design and Technology (LTEC) Program at the University of Hawai‘i at Mānoa (UHM). I am conducting a usability study to complete the requirements in order to earn my graduate degree. The purpose of this usability study is to evaluate the functionality and value of a website developed as a resource to support prospective dental hygiene practitioners from a Dental Hygiene program in Honolulu, Hawaii as they transition to become licensed professionals.

You have been selected to participate in this study based on your age (must be at least 18 years or older), background (must be a senior dental hygiene student attending UH Manoa), and technology and computer experience.

Overview of the Study:

A total of two rounds of usability studies will be conducted. Each round will consist of three sessions lasting approximately thirty minutes. The study facilitator will meet each of the participating volunteers in person — a room will be reserved at UHM Administrative Services Building 2. For convenience, all participants will use the facilitator’s laptop where desktop screen activities and conversations will be recorded using a screen and audio recording tool. With the participant’s consent, the facilitator will begin the recording and ask the pre-study interview questions. After the pre-study interview, the facilitator will proceed with the scenarios/tasks protocols (a Scenarios & Task Sheet will be sent to the participants prior to the study). Upon completion of the scenarios/task portion, the facilitator will conclude the study with the post-study interview.

Activities:
1. Facilitator will collect page three of the Consent & Recording Release Form.
2. Facilitator will begin session recording.
   ● Proceed with the usability study: pre-study interview, scenarios/tasks sessions, and post-study interview.
3. Facilitator will end recording and conclude the study.

Benefits and Risks: Participating in this usability study will have no direct benefits and/or risks to your well-being. Please keep in mind that the study is to test the website, not you. You can’t
do anything wrong here. In fact, this is probably the one place where you don’t have to worry about making mistakes. If at any point in time during the study that you feel stressed or uncomfortable, you have the freedom to stop and withdraw from the session or study altogether.

Page 1 of 3

Privacy and Confidentiality: Your privacy and confidentiality is important to me. All information acquired during the study will be kept safe and confidential. I will ensure your anonymity by not requiring you to disclose any of your private information during the study (such as your name; however, for data collection purposes, you will be identified as “Participant A, B, C...etc.”). I assure you that only the facilitator will have access to the raw recordings of the desktop screen activities and conversations from our session. However, transcriptions of the recording as well as any data collected during the study will be shared with my advisor(s) and classmates from the LTEC 690 course. Again, I would like to stress that no personal information will be shared. All recorded data and/or information (including audio and desktop screen activities) will be discarded upon my completion of this Master’s program.

Voluntary Participation: Your participation in this usability study is completely voluntary. It is your decision to participate in this study and there will be no penalty or consequences if you decide to opt-out or withdraw from the study. Your relationship with University of Hawaii or myself will not be forfeited.

Questions: If you have any questions regarding the study or your rights as a participant, please feel free to contact me or my advisor.

Pamela Terrado (Student/Study Facilitator)  Dr. Grace Lin (Advisor)
Phone: (808) 234-4275  Phone: (808) 956-9989
Email: pterrado@hawaii.edu  Email: gracelin@hawaii.edu

Please write your initial, provide the date, and sign page three of the Consent & Recording Release Form. I will collect this page when I meet with you on our scheduled session.

***Please keep the first two pages for your records***
Consent & Recording Release Form

Please write your initial next to the following, and sign and date below to indicate that:

_______ You have read and understood the information provided in this Consent & Recording Release Form.

_______ You agree to participate in the study conducted and recorded by Pamela Terrado (study facilitator) in partial fulfillment of her Master’s project for the Department of Learning Design and Technology (LTEC) Program at the University of Hawaiʻi at Mānoa (UHM).

_______ Your participation in this usability study is voluntary, and that you agree to immediately raise any concerns or areas of discomfort during the session with the study facilitator.

_______ You agree and consent to the audio and desktop screen recordings of the session by the study facilitator.

_______ You agree and consent to the use of the recordings and other collected data for research purposes only.

_______ You understand and agree that your name or your photo will not be taken during the usability study session to maintain your anonymity and protect your confidentiality.

_______ The facilitator answered any question(s) I have about the study.

_______ The facilitator gave me a copy of this Consent & Recording Release Form for my records.

Date Signed: ______________

Name of Participant (Print): ____________________________________________________

Participant’s Signature: ________________________________________________________
## Appendix G
### Scenarios and Tasks Sheet

<table>
<thead>
<tr>
<th>Scenario: Your dental hygiene instructor shared with you a link to a website. This is the homepage of that website. Please give me your initial reaction to this page. Feel free to explore this page as you normally would. You can scroll around with the mouse, but please don’t click on anything just yet</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Task 1:</strong> Using this website, where would you go to find information about license application? Please remember to think-out-loud.</td>
</tr>
<tr>
<td>If you feel that you have completed this task, please say, “complete;” or if you can’t find the information being asked, please say, “I can’t find it.”</td>
</tr>
<tr>
<td><strong>Task 2:</strong> Using this website, where would you go to find information about the four regional clinical examinations accepted for license application in the State of Hawaii. Please remember to think-out-loud.</td>
</tr>
<tr>
<td>If you feel that you have completed this task, please say, “complete;” or if you can’t find the information being asked, please say, “I can’t find it.”</td>
</tr>
<tr>
<td><strong>Scenario:</strong> You are a prospective dental hygiene practitioner transitioning to become a licensed professional and would like to know more about how you can prepare yourself.</td>
</tr>
<tr>
<td><strong>Task 3:</strong> You heard about “CDT Codes” but you are unsure of what they are. Using this website, where can you find the information explaining what a CDT Code is. Please remember to think-out-loud.</td>
</tr>
<tr>
<td>If you feel that you have completed this task, please say, “complete;” or if you can’t find the information being asked, please say, “I can’t find it.”</td>
</tr>
<tr>
<td><strong>Scenario:</strong> Congratulations! You’ve landed your first job as a registered dental hygienist. You are now seeing ‘paying’ clients; however, you’re still not acclimated with practicing dental hygiene outside of a controlled clinical setting.</td>
</tr>
<tr>
<td><strong>Task 4:</strong> Your patient is curious about dental implants. Using this website, where can you find information about dental implants that you would use to help you educate your patient. Please remember to think-out-loud.</td>
</tr>
<tr>
<td>If you feel that you have completed this task, please say, “complete;” or if you can’t find the information being asked, please say, “I can’t find it.”</td>
</tr>
</tbody>
</table>
Appendix H
Usability Script

Facilitator Lab Setup
***To reduce technological problems; participants will use the facilitator’s laptop for the usability study. ***

Test Day
1. Setup computer and attach all cords/ peripherals.
   - Plug in to a power outlet.
   - Use a wired mouse.
2. Open the website that will be used for the usability study (make sure that the sidebar is hidden).
3. Launch “Quicktime Player.”
   - File → “New Screen Recording.”
   - Press “record button” when ready; an instruction prompt will appear stating,
     “Click to record full screen. Drag to record part of the screen. End recording by clicking the stop button in the menu bar.”
   - Click anywhere to start recording.

Facilitator Script
Modified from Usability Script — Rocket Surgery Made Easy © 2009 Steve Krug

- Collect page three of the Consent & Recording Release Form (make sure that it’s initialed, dated and signed).
- Click anywhere to start recording.

INTRODUCTION:

Hello, Participant ___. My name is Pamela Terrado, and I’m going to be walking you through this session today.

Before we begin, I have some information for you, and I’m going to read it to make sure that I cover everything.

You probably have an idea of why I asked you here, but let me go over it again briefly. I would like you to test the website that I’m working on so I can see whether it works as intended. The session should take about thirty minutes.

The first thing I want to make clear is that I’m testing the website, not you. You can’t do anything wrong here. In fact, this is probably the one place today where you don’t have to worry about making mistakes.
As you use the website, I’m going to ask you to (as much as possible) try to think out loud: to say what you’re looking at, what you’re trying to do, and what you’re thinking. This will be a big help to me. We are going to follow the scenarios and tasks that I sent you earlier through your hawaii.edu email address.

Also, please don’t worry that you’re going to hurt my feelings. I’m doing this to improve the website, so I need to hear your honest reactions.

If you have any questions as we go along, just ask them. I may not be able to answer them right away, since I’m interested in how people do when they don’t have someone sitting next to them to help. But if you still have any questions when we’re done, I’ll try to answer them then. And if you need to take a break at any point, just let me know.

I would like to thank you again for your permission and consent in allowing me to record today’s session, and I would like to inform you again that all recordings will only be used to help me figure out how to improve the website; it won’t be seen by anyone but me. This helps me because I don’t have to take as many notes. Let’s begin.

Before we look at the site, I’d like to ask you just a few questions about your experience in the dental field.
- **Ask participant pre-study interview questions — facilitator to record answers in Google Forms.**

OK, great. We’re done with the pre-study interview, and we can return to testing the website.
- **Ask participants to assume scenarios and perform tasks.**
- **Have hard-copy for participants to refer to.**

Now, I’m going to ask you to assume a few scenarios and perform some specific tasks. I’m going to read each one out loud. Here’s a hard-copy for you to refer to if you need it.

I’m also going to ask you to do these tasks while ‘thinking-out-loud,’ I’ll learn a lot more about how well the site works that way.

- **Allow the participant to proceed from one task to the next until task has been completed or until participant says, “I can’t find it”**.

---

### Initial Perception

**Scenario:** Your dental hygiene instructor shared with you a link to a website. This is the homepage of that website. Please give me your initial reaction to this page. Feel free to explore this page as you normally would. You can scroll around with the mouse, but please don’t click on anything just yet.

**Facilitator will ask:**
1. *Have you ever seen this website before?*
2. *Please give me your initial impressions about the layout of this page and what you*
think of the colors, graphics, photos, etc.
3. What do you think is the purpose of this website?
4. Who do you think the website is intended for?
5. Without clicking on anything yet, please describe the options you see on the homepage and what you think they do. Feel free to move around the page, but again I’ll ask you not to click on anything right now.

Facilitator’s Notes: Initial participant perception.

**Scenario:** You are a prospective dental hygiene practitioner transitioning to become a licensed professional and would like to know more about how you can prepare yourself.

**Task 1:** Using this website, where would you go to find information about license application? Please remember to think-out-loud.

If you feel that you have completed this task, please say, “complete;” or if you can’t find the information being asked, please say, “I can’t find it.”

**Facilitator will ask:**
1. Do you think you found the information that you’re looking for? ☐ YES ☐ NO
2. Is the information you found adequate? ☐ YES ☐ NO
3. Please rate the level of finding the information:
   ☐ 1 = very easy ☐ 2 = somewhat easy ☐ 3 = difficult

**Task 2:** Using this website, where would you go to find information about the four regional clinical examinations accepted for license application in the State of Hawaii. Please remember to think-out-loud.

If you feel that you have completed this task, please say, “complete;” or if you can’t find the information being asked, please say, “I can’t find it.”

**Facilitator will ask:**
1. Do you think you found the information that you’re looking for? ☐ YES ☐ NO
2. Is the information you found adequate? ☐ YES ☐ NO
3. Please rate the level of finding the information:
   ☐ 1 = very easy ☐ 2 = somewhat easy ☐ 3 = difficult

**Facilitator’s Notes: RQ1, RQ2, RQ3**

**Scenario:** Congratulations! You’ve landed your first job as a registered dental hygienist. You are now seeing ‘paying’ clients; however, you’re still not acclimated with practicing dental hygiene outside of a controlled clinical setting.
**Task 3:** You heard about “CDT Codes” but you are unsure of what they are. Using this website, where can you find the information explaining what a CDT Code is. Please remember to think-out-loud.

If you feel that you have completed this task, please say, “complete;” or if you can’t find the information being asked, please say, “I can’t find it.”

**Facilitator will ask:**
1. **Do you think that you found the information that you’re looking for?**
   - [ ] YES  [ ] NO
2. **Is the information you found adequate?**
   - [ ] YES  [ ] NO
3. **Please rate the level of finding the information:**
   - [ ] 1 = very easy  [ ] 2 = somewhat easy  [ ] 3 = difficult

**Task 4:** Your patient is curious about dental implants. Using this website, where can you find information about dental implants that you would use to help you educate your patient. Please remember to think-out-loud.

If you feel that you have completed this task, please say, “complete;” or if you can’t find the information being asked, please say, “I can’t find it.”

**Facilitator will ask:**
- **Do you think that you found the information that you’re looking for?**
  - [ ] YES  [ ] NO
- **Is the information you found adequate?**
  - [ ] YES  [ ] NO
- **Please rate the level of finding the information:**
  - [ ] 1 = very easy  [ ] 2 = somewhat easy  [ ] 3 = difficult

**Facilitator’s Notes: RQ1, RQ2, RQ3**

OK, thanks! That was very helpful. We’re done with the scenarios and tasks portion of the study. Do you have any questions for me?

Before I conclude this session, I would like to ask you a few questions about your experience with the website.
- **Ask participant post-study interview questions — facilitator to record answers in Google Forms.**

That concludes the usability study. Thank you for your time and willingness to participate.
- **End and save session.**
- **After the session:**
  - Quickly check the video to ensure the integrity of audio and video before dismissing the participant.
Appendix I
Pre-Study Interview Questions

For target participant demographics, knowledge base, and current experience.

- Gender (required)
  [ ] Male  [ ] Female
- Age (required)
  [ ] 18-22  [ ] 23-27  [ ] 28-32  [ ] 33-37  [ ] 38-42  [ ] 43 and over
- Do you have any experience working in the dental field? (required)
  [ ] YES  [ ] NO
    - If you answered “yes” to the question above.
      - What is (or was) your position?
        [ ] Dental Assistant
        [ ] Receptionist
        [ ] Hygiene Assistant
        [ ] Financial Coordinator
      - How long have you been working (or have worked) in this position?
        [ ] 0-1 year  [ ] 2-3 years  [ ] 4-5 years  [ ] 6 years or more
      - List your duties:
        Short answer: _____________________
- Have you researched or asked anyone about what to expect after dental hygiene school? (required)
  [ ] YES  [ ] NO
    - If you answered “yes” to the question above.
      - What did you use to do research? Or who did you ask? (please be specific)
        Short answer: _____________________
      - Did your research help you broaden your expectations after dental hygiene school?
        [ ] YES  [ ] NO
          - If you answered “yes” to the question above.
            - What information was most helpful?
              Short answer: _____________________
Appendix J
Post-Study Interview Questions

For target participant website and content feedback.

- If you had to give the website a grade, from A to F, where “A” was exemplary and “F” was catastrophic, what grade would you give it? (required)
  - □ A  □ B  □ C  □ D  □ F
    - Why? (required)
      Short answer: ________________________________

- How satisfied are you with the design, and website performance? (required)
  - □ Very satisfied
  - □ Somewhat satisfied
  - □ Dissatisfied
  - □ Undecided
    - Why? (required)
      Short answer: ________________________________

- Please think back to other websites you have visited before. Have you ever needed to perform tasks like the ones you did in the usability study today? (required)
  - □ YES  □ NO
    - If you answered “yes;” compared to your prior experience, would you say that the tasks you performed today were easier or more difficult?
      - □ Easier  □ Difficult
        - Why?
          Short answer: ________________________________

- If you could make one significant change to this website, what change would you make? (required)
  Short answer: ________________________________

- After participating in this study, would you recommend this website to any of your classmates? (required)
  - □ YES  □ NO
    - Why? / Why not? (required)
      Short answer: ________________________________

Please help me improve the website: (required)

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Undecided</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>-----------------------------------------------------------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>It is easy to find my way around the website.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can get to information quickly.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The overall website design is appealing.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The website has a clear purpose and the content interest me.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix K
Data Collection Sheet

Initial Website Perception

1. Have you ever seen this website before? □ YES □ NO

2. Please give me your initial impressions about the layout of this page and what you think of the colors, graphics, photos, etc.

3. What do you think is the purpose of this website?

4. Who do you think the website is intended for?

5. Without clicking on anything yet, please describe the options you see on the homepage and what you think they do. Feel free to move around the page, but again I’ll ask you not to click on anything right now.

<table>
<thead>
<tr>
<th>Tasks</th>
<th>Time on Task (in seconds or minutes)</th>
<th>Success Rate (Pass or Fail)</th>
<th>Follow-up Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>1. Do you think that you found the information that you’re looking for? □ YES □ NO</td>
</tr>
<tr>
<td>Task 1</td>
<td></td>
<td></td>
<td>2. Is the information you found adequate? □ YES □ NO</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3. Please rate the level of finding the information: □ 1 = very easy</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>□ 2 = somewhat easy</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>□ 3 = difficult</td>
</tr>
</tbody>
</table>

1. Do you think that you found the information that you’re looking for? □ YES □ NO
2. Is the information you found adequate? □ YES □ NO
<table>
<thead>
<tr>
<th>Task 2</th>
<th>3. Please rate the level of finding the information:</th>
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<tr>
<td></td>
<td>☐ 1 = very easy</td>
</tr>
<tr>
<td></td>
<td>☐ 2 = somewhat easy</td>
</tr>
<tr>
<td></td>
<td>☐ 3 = difficult</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>Task 3</th>
<th>Pass or Fail</th>
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<tbody>
<tr>
<td></td>
<td>1. Do you think that you found the information that you’re looking for?</td>
</tr>
<tr>
<td></td>
<td>☐ YES ☐ NO</td>
</tr>
<tr>
<td></td>
<td>2. Is the information you found adequate?</td>
</tr>
<tr>
<td></td>
<td>☐ YES ☐ NO</td>
</tr>
<tr>
<td></td>
<td>3. Please rate the level of finding the information:</td>
</tr>
<tr>
<td></td>
<td>☐ 1 = very easy</td>
</tr>
<tr>
<td></td>
<td>☐ 2 = somewhat easy</td>
</tr>
<tr>
<td></td>
<td>☐ 3 = difficult</td>
</tr>
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</table>

<table>
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<tr>
<th>Task 4</th>
<th>Pass or Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Do you think that you found the information that you’re looking for?</td>
</tr>
<tr>
<td></td>
<td>☐ YES ☐ NO</td>
</tr>
<tr>
<td></td>
<td>2. Is the information you found adequate?</td>
</tr>
<tr>
<td></td>
<td>☐ YES ☐ NO</td>
</tr>
<tr>
<td></td>
<td>3. Please rate the level of finding the information:</td>
</tr>
<tr>
<td></td>
<td>☐ 1 = very easy</td>
</tr>
<tr>
<td></td>
<td>☐ 2 = somewhat easy</td>
</tr>
<tr>
<td></td>
<td>☐ 3 = difficult</td>
</tr>
</tbody>
</table>
Appendix L
Prototype 1 (Licensure and Job Search Page)

Job Search

Soon after becoming a licensed professional, you will encounter many uncertainties as you embark on your journey in the field of dentistry. The initial step in establishing yourself within this field is to find an employment. Sadly, not many dental hygiene programs prepare their students for job searching.

To guide you in your employment preparation, a few carefully chosen articles are provided below to help you construct your resume and prepare you for job interviews.

- 4 job hunting documents every dental hygienist should have
- Looking for a new dental hygiene job?
- Brushing Up for Your Interview
- How to interview for your first position as a dental hygienist

Articles about DH job search; external links ONLY
Appendix M
Prototype 2 (Licensure and Job Search Page)
Appendix N
Theory of Usability Equation
Time Based Efficiency = \[ \sum_{j=1}^{R} \sum_{i=1}^{N} \frac{n_{ij}}{t_{ij}} \] \[ \frac{1}{NR} \]

Where:

\( N \) = The total number of tasks (goals)
\( R \) = The number of users
\( n_{ij} \) = The result of task \( i \) by user \( j \); if the user successfully completes the task, then \( n_{ij} = 1 \), if not, then \( n_{ij} = 0 \)
\( t_{ij} \) = The time spent by user \( j \) to complete task \( i \). If the task is not successfully completed, then time is measured till the moment the user quits the task.

Example: Calculation of time-based efficiency

Once again, let us take a practical example. Suppose there are 4 users who use the same product to attempt to perform the same task (1 task). 3 users manage to successfully complete it — taking 1, 2 and 3 seconds respectively. The fourth user takes 6 seconds and then gives up without completing the task.

Taking the above equation:

\( N \) = The total number of tasks = 1
\( R \) = The number of users = 4

User 1: \( N_{ij} = 1 \) and \( T_{ij} = 1 \)
User 2: \( N_{ij} = 1 \) and \( T_{ij} = 2 \)
User 3: \( N_{ij} = 1 \) and \( T_{ij} = 3 \)
User 4: \( N_{ij} = 0 \) and \( T_{ij} = 6 \)

Placing the above values in the equation:

\[ \text{Time Based Efficiency} = \left( \frac{1}{1} + \frac{1}{2} + \frac{1}{3} + \frac{0}{6} \right) \frac{1}{1 \times 4} = 0.46 \text{ goals/sec} \]
Appendix P
Prototype 3 (Licensure Page)