Learning Module Focused on Google Internet Search Skills for Middle School

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Abstract: The World Wide Web is the largest information source for students seeking out information. A strong information literacy foundation is essential to students’ scholastic success as it allows students to find, evaluate, and use information effectively. However, many secondary students have indicated concerning levels of information literacy skill development. These students have demonstrated difficulty even at the basic levels of the online search process. This paper reports on a small instructional design study where a group of participants were shown how to utilize basic Internet searching skills to support middle school students’ ability to conduct online searches. Adults 18 and over participated in the study due to logistical constraints. Evidence from this study indicates that the module was effective in aiding the participants’ understanding of how to search effectively online. Based on qualitative feedback, a majority of the participants view search strategies as a useful tool that they gained confidence in utilizing and would likely use in the future. Moreover, this learning module could benefit from the incorporation of authentic opportunities that provide students with actual guided online searching practice, empowering students to further initiate and explore the use of learned search strategies.

Introduction

In the current digital age, the World Wide Web is the largest information source for individuals seeking out information. Students use the Internet for a variety of personal and academic reasons, and a strong information literacy foundation is essential to students’ future scholastic success (Thomas, 2011). Information literacy skills are not only necessary for academic purposes, such as research papers and group presentations, but such skills are also highly desired professionally. It is essential that individuals are able to find, evaluate, use and share information since strong analytical, critical thinking and problem-solving skills can be expected to translate into a capable, adaptable, and valuable employee (Eisenberg, 2010). Information literacy skills support individuals in their full participation as informed citizens within a democratic society. Therefore, the purpose of this instructional design module is to develop and evaluate a web-based instructional module teaching basic information literacy skills to support middle school students’ ability to effectively conduct online searches.
Background

Research has indicated concern with levels of information literacy skill development among secondary and post-secondary students, as students have demonstrated difficulty with higher-level information searching and critical evaluation skills (Julien, 2009; Walraven, 2009). The Boswell 2007 Trails Study (Tools for Real Time Assessment of Information Literacy Skills) showed that the greatest weakness of students was in evaluating information and using Boolean search techniques. Although web searches have become an indispensable part of the academic research process, a study conducted at Illinois Wesleyan University discovered that 3 out of 4 students were unable to perform a "reasonably well-executed search...the majority of students exhibited significant difficulties that ranged across nearly every aspect of the search process" (Kolowich, 2011). Fundamentally, the general population of students does not have an understanding of how to effectively find the information they need using effective search strategies, such as Boolean.

There are many reasons why online search skills are not emphasized at schools. With increased educational budget cuts that curtail the efforts of librarians, who are largely responsible for the teaching of information literacy skills, information literacy is not a highly emphasized skill in public education (Chu, 2011). Even with an involved librarian present, developing online search skills in students cannot be viewed as a “one lesson and out” approach. Students require adequate time to practice, process, and develop these skills. However, with the rigorous academic curriculum and limited time constraints that come with traditional education, students do not have sufficient independent practice time needed to comprehensively develop these skills during regular school hours. An asynchronous web-based instructional module teaching basic information literacy skills, may serve as an effective tool to support students’ learning process of effectively conducting online searches.

Methodology

Test Audience of the Instructional Module

This module was created for middle school students ranging from 6th-8th grade. Although the targeted age range of this module was middle school, due to the logistical obstacles in obtaining Department of Education student participation, the participants of this study included adults over the age of 18. An invitation for evaluation was sent via email to several teachers and adults personally known by the researcher, including students from the Educational Technology Department of the University of Hawaii Manoa. Participation in the study was voluntary and anonymous, and followed a detailed consent form. No official form of compensation was offered to participants. Nearly half of the participants were involved in the educational sector themselves, and able to provide feedback from an instructional perspective.
Cognitively, the target audience of middle school students may or may not have experience with Internet searching skills, though all have used a computer and the Internet. They have the ability to operate a computer, use the Internet, read, view graphics, hear, and understand English. Social aspects include learners who interact regularly with others and may use the Internet for social media, games, entertainment, email, and other forms of personal or academic use. Affectively, the learners may or may not be hesitant to delve deeper into understanding effective online searching strategies based on various factors: comfort with current online search habits, or an authentic desire to know how to improve their searches. Convenience and ease of access is also valued by learners.

Module Development and Design

The online search strategy module was designed on weebly.com, a free user-friendly website editor. The web-based approach was selected to allow for a logical construction as well as easy access for participants. This approach also suited the “digital native” characteristic of the middle school target audience. These students have been surrounded by technology since birth, and are accustomed to digital devices (Prensky, 2001). The web-based medium as a format for acquiring information thereby helped support the comfort levels of participants. Additionally, participants were able to pace themselves as they completed the module to allow them to learn outside of rigorous traditional school time constraints.

The module was divided into two primary instructional sections: “Savvy Vocabulary” and “Savvy Search Skills.” “Savvy Search Skills” included five lesson components: Boolean Operator: AND, Find Function, Use of Quotations for Phrase Searching, Boolean Operator: OR, Boolean Operator: "-" Minus Sign, and Truncation (*). The final component of the module included an optional online searching game called “Google-a-Day” for students to play following the completion of the module to implement the skills they learned. (See Figure 1).

Figure 1. Example page from the instructional module including a screen-captured video
The module utilized the ARCS Model of Motivation (Keller, 2008) as a framework to design instruction that would appeal to the middle school target audience. According to the ARCS Model, the four elements of Attention, Relevance, Confidence and Satisfaction are to be employed in the design process. Format, font, and imagery were designed to enhance the learning experience without diverting from the content. Bright colors, fun simple language, an upbeat and quirky “Savvy Searching Tutor,” pertinent supporting images, interesting examples and scenarios, and videos were used to gain and maintain attention of participants. Photographic images of other middle school students, and a warmly written welcome, along with a video prelude that briefly outlined reasons why Internet searching skills are valuable, helped establish relevance to the learner. The module’s written content was simplified with terminology the participants were thought to be familiar with, clearly stated directions and objectives at the beginning of each mini lesson, scaffolding instruction, examples and non-examples, and answer keys – all of which were included to improve the likelihood of success – this in turn helped develop a deeper sense of confidence in learners. Assimilating plentiful words of encouragement each step of the way, as well as a concluding game that allowed students to practice the searching skills were included to generate feelings of satisfaction.

It was anticipated that middle school students might click on links in the navigation bar if those links were visible. The learning module was therefore designed to be navigated only via hyperlinked text at the bottom of each page. The navigation bar was mostly disabled so that participants could not skip ahead or go back to take the pre-test again. (See Figure 2).

**ANSWER KEY:**

Open a new tab by holding down Control T (on PCs) or Command T (on Macs). On this new page, go to the Google Search Engine Page (google.com). Search for APPLES AND BANANAS. How many results did you get?

About 2,540,000 results. (Answers may vary, depending on the day and time of search.)

What do you notice about the results of your APPLES AND BANANAS search?

All of my results contain both keywords "apples" AND "bananas."

What command can you use to find a keyword on a website?

Command F (on a Mac) or Control F (on a PC).

You sure are building those savvy skills up! Click on the green button below to learn about using Quotations for Phrase-searching and Boolean Operator OR.

**Figure 2.** Limited navigation options.
Evaluation Elements

The module included two surveys in addition to the pre-test, embedded test questions, and post-test. These included a demographic/attitudinal pre-survey (25 questions for the pre-test, 20 questions for the post-test), which were placed prior to the pre-test and following the post-test. The pre-test, embedded-test questions, post-test, demographic-attitudinal surveys were created using Google forms.

Participants were asked to submit a randomly generated PIN number, so their identity would remain confidential while their progress would be traceable. Because participants were not supervised, they completed all components of the module based on the honor system. Participants were given a total of four weeks to complete the entire module. However, a couple of participants ended up completing the module after the time frame, so the total implementation lasted approximately six weeks, beginning February 7, 2013 through March 15, 2013. Although it was unnecessary for the researcher to include late responses, she chose to include them because it provided a more comprehensive assessment of participants’ understanding.

Results

Analysis of the Pre-test and Post-test

14 participants started the module and completed the pre-test and some embedded questions. 12 participants (four male, eight female) completed the module from start to finish; only the test-taking participants who fully completed the module were included in the results. Their ages ranged from 26-63. Six participants were in the age range of 18-29, four people in the age range 30-39, one participant in the 50-59 age range, and one in the 60-69 age range.

Results show a positive increase from pre-test to post-test for every question. The average score for the pre-test was 56%, and 90% for the post-test. The lowest score on the pre-test was 29% while the lowest score on the posttest was 76%. A total of 17 questions were present in the pre-test, embedded-test, and post-test. Below (Table 1), the 12 participants’ total percentage scores from Pre-Test, Embedded Questions, and Post-Test are displayed.

<table>
<thead>
<tr>
<th>Participant (by Number)</th>
<th>Pre-Test</th>
<th>Embedded Test</th>
<th>Post-Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant #1</td>
<td>47%</td>
<td>100%</td>
<td>88%</td>
</tr>
<tr>
<td>Participant #2</td>
<td>47%</td>
<td>94%</td>
<td>94%</td>
</tr>
<tr>
<td>Participant #3</td>
<td>82%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Participant #4</td>
<td>53%</td>
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<td>Participant #5</td>
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<td>Participant #6</td>
<td>41%</td>
<td>82%</td>
<td>76%</td>
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<td>53%</td>
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<td>82%</td>
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<td>29%</td>
<td>88%</td>
<td>88%</td>
</tr>
<tr>
<td>Participant #9</td>
<td>47%</td>
<td>82%</td>
<td>88%</td>
</tr>
<tr>
<td>Participant #10</td>
<td>94%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Participant #11</td>
<td>65%</td>
<td>87%</td>
<td>94%</td>
</tr>
</tbody>
</table>
Table 2. Bar Graph of Pre-Test, Embedded, and Post-Test Assessment Scores

Table 3. Average Percentage Correct Per Question (Pre-Test, Embedded Test, Post-Test)

<table>
<thead>
<tr>
<th>Question #</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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<th>14</th>
<th>15</th>
<th>16</th>
<th>17</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Pre-Test (%)</td>
<td>92</td>
<td>42</td>
<td>83</td>
<td>75</td>
<td>83</td>
<td>83</td>
<td>100</td>
<td>33</td>
<td>75</td>
<td>75</td>
<td>17</td>
<td>33</td>
<td>33</td>
<td>92</td>
<td>25</td>
<td>33</td>
<td>12</td>
</tr>
<tr>
<td>Average Embedded Test (%)</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>92</td>
<td>100</td>
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<td>83</td>
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<tr>
<td>Average Post-Test (%)</td>
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<td>100</td>
<td>100</td>
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<td>92</td>
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<td>83</td>
<td>100</td>
<td>100</td>
<td>83</td>
<td>42</td>
</tr>
</tbody>
</table>

Attitudes Toward the Module

Although the sample subjects were quite different from the actual target audience, the participants served as a technical guide. The majority expressed a positive opinion towards online searching skills, as well as increased confidence in their search skills. The majority of participants gave high scores to the module instructional content, and found the module to be clear, easy to understand, logical, manageable, and motivational. Participants had varying opinions regarding the difficulty of the module, and a few participants expressed problems regarding wording, clarification, and formatting of instructional content, along with a couple of technical difficulties with navigation and submission.
The valuable feedback received clearly indicated that there was more room for improvement, and reinforced the challenge of creating good instructional materials. The decrease in the number of volunteers may have occurred due to the fact that if participants forgot to answer a question, or left a question blank, the student’s entire document would not be submitted to Google Docs. Although participants were forewarned in an email about making sure that every query in this set of tests and surveys was answered in order to be complete and submitted via Google Docs, there were a few missing documents. This proved to be a frustration, not only for me, the researcher, but also a couple of participants who missed a question without realizing it, and disappointingly realizing their hard work may not have been submitted.

One participant commented that the module could have been “less lengthy,” while another participant commented on needing examples that were shorter and easier to read. Other participants commented on the wording choice. For instance, “I’m not sure ‘non-example’ is the best term. It was a bit confusing.” A couple of participants commented that they needed clarification regarding the concept of truncation. Mentioning that a “Find Box” will appear at the top of the screen would help users know what to look for when the tap Command/Control F. This participant called me for help while completing the module, when he did not notice the Find Box pop up at the top right hand corner of his screen. Participant #11, a 35-year-old instructor in the Department of Education, summed up the overall feedback provided, “This was a great instructional module. I will definitely use the information I learned when I search the Internet.” This comment exemplified fulfillment of the module’s main purpose – real-life application.

Discussion

Responses indicated that the instructional module was useful for all of the participants. The information provided within the module allowed participants to build a strong overview of basic search skills and provided sufficient information to help students make decisions in implementation as they completed module questions.

Due to the lower results of the terminal objective test item #17, as well as the difficulty participants demonstrated in answering correctly for the questions in higher objectives, it was concluded that learners found it more challenging to synthesize the more complex combination of search strategies necessary in conducting more advanced searches. In the future revised module, the instructional designer will add more examples and descriptions on the tools necessary to combine search strategies, along with practice exercises that focus on synthesizing search strategies to improve mastery of the terminal objective.

This module teaches the very basics of effective online searching. There are many additional facets of information literacy that must be explored. Moreover, this learning module could benefit from the incorporation of authentic opportunities that would provide students with actual guided online searching practice, empowering students to
further initiate and explore the use of learned search strategies.

Improved emphasis on the review and revision process of the module would also have been of benefit. In the future, upon revision of the test items, it would have been advantageous to take the extra time to conduct one-on-one studies on a small scale in order to catch other inconsistencies to build clarity within the module. Focus groups would have enhanced content creation and provide a means of measuring delivery effectiveness. Providing the entire module on audio, or giving participants options of participating online, with audio, or on paper to freely mark up, highlight, and record notes and ideas as they go through the module, might be helpful.

Another idea for future exploration includes incorporating interdisciplinary instruction with the taught information literacy skills. Such modules may integrate subject matter and information-seeking skills, or the planning of teachers and library media specialists together, so that students have improved opportunities for learning (Bucher, 2000).

Conclusion

An asynchronous online module may serve as a novel tool for the purpose of supporting students in their understanding of the process of utilizing online search skills. This project, while limited in size, demonstrated that participants found the process effective and engaging. The overall scores of the pre-test and post-test indicate that the final module was successful in many aspects, particularly in presenting informational content and advancing the understanding of online search skills in our learners. However, for learning objectives that require a more complex synthesis of search strategies, or in consideration of the integration of more authentic practice opportunities, a different format or instructional means may be more appropriate or effective. Further studies would be necessary to explore other options.

References


