Developing a Self-Paced, Web-based Instructional Module for Dissertation Preparation

Ritsuko Iyoda
Department of Educational Technology
University of Hawai‘i at Mānoa
Honolulu, Hawaii
United States of America
ritsukoi@hawaii.edu

Abstract: As the number of part-time doctorate students increases, institutions offering evening or online Ph.D. programs need to re-evaluate the effectiveness of their dissertation preparation courses to help these part-time learners succeed. The University of Hawai‘i at Mānoa offers a college-wide Ph.D. in Education with a specialization in Educational Technology (ETEC). The ETEC Ph.D. program is campus-based, but courses are offered in the evenings with many courses offered in hybrid or online formats. ETEC 750e “Educational Technology Issues: Research” is a seminar that ETEC doctoral students must complete before advancing to candidacy and it plays an important role in dissertation preparation. However, due to the number of topics covered in the seminar, instructors have expressed concern over students’ concept attainment of one the seminar topics, prospectus writing. To improve students' prospectus writing skills, the author developed a self-paced, web-based instructional module on prospectus writing to supplement a class lecture, and implemented a formative evaluation to ensure the quality of the module. Five of the eight students enrolled in ETEC 750e in spring 2014 completed the online module, and the data showed a positive shift in their knowledge and attitudes towards prospectus writing. Implications of the project are also discussed.

Introduction

The number of doctorate degrees conferred by U.S. postsecondary degree-granting institutions has continued to increase over the past decade (Institute of Education Sciences, 2011). It is estimated that this number has increased about 35%, from 44,077 to 67,716 between 1998-1999 and 2008-2009, and is projected to increase 57% overall between 2008-2009 and 2020-2021. One explanation for the growth of postsecondary student enrollment may be the flexible curriculum offered by some institutions, allowing graduate students to continue their study while also maintaining a full-time job. In fact, about 38% of students enrolled in postsecondary degree-granting institutions in 2010 were categorized as part-time students (Institute of Education Sciences, 2011).

Doctoral students working full-time, which Holmes, Seay, and Wilson (2011) called, "*full-time leaders, part-time learners*," (p. 9) are different from traditional doctoral students working part-time as teaching or graduate assistants on campus. For example, doctoral students with full-time employment may have widely differing backgrounds. Furthermore, they are generally problem-centered and interested in immediate application of knowledge, which are some of the same characteristics of adult learners (Merriam, 2002). At the same time, most have family obligations that compete with their academic work, and they may be further restricted by their limited knowledge and experiences with scientific research. To help these "full-time leaders, part-time learners" succeed, it is important for institutions offering evening or online Ph.D. programs to re-evaluate the effectiveness of their pre-dissertation courses.

The College of Education at the University of Hawai‘i at Mānoa offers a college-wide Ph.D. in Education with a specialization in Educational Technology (ETEC). The ETEC Ph.D. program is campus-based, but the courses are offered in the evenings with many courses offered in hybrid or online formats to support working professionals. ETEC 750e "Educational Technology Issues: Research" is one of the seminars that ETEC doctoral students must complete before advancing to candidacy. This seminar provides students with the opportunity to learn how to develop a short, written dissertation idea paper, also known as a doctoral dissertation prospectus. The doctoral dissertation prospects is a formal benchmark that signifies a student has completed his or her course work and is at the dissertation writing stage of the program. Therefore, ETEC 750e plays an important role in dissertation preparation and is crucial for students to successfully meet the seminar's expectations and requirements.

However, due to the number of topics covered in ETEC 750e, insufficient time is allocated to teach the prospectus writing. As a result, instructors of ETEC 750e expressed concern over students' concept attainment of prospectus writing and the quality of their prospectuses, which are required as a final project in the seminar. To improve students' prospectus writing skills, the author developed a self-paced, web-based instructional module on prospectus writing for ETEC 750e students. While a module prototype was being created, a formative evaluation, comprised of peer-reviews, instructor-reviews, and a small group testing, was implemented to ensure the quality of the instructional module. Of eight doctoral students enrolled in ETEC 750e in spring 2014, five participated in and completed the small group testing. This paper summarizes the findings of the small group testing and discusses possibilities and challenges of using web-based instruction to supplement a class lecture in a pre-dissertation course.

Methods

Overview of the Project

In ETEC 750e, prospectus writing was traditionally taught in a lecture format in Week 10. Instead of completely replacing the lecture in Week 10, a self-paced, web-based instructional module was chosen to supplement the class lecture and was introduced in Week 1. This combination of web-based instruction and face-to-face lecture format offered

the following advantages: First, the instructor did not need to revise the current syllabus. Second, it allowed part-time students to learn the concept at their own pace. Third, introducing the topic earlier in the semester provided students with more time to conduct their literature reviews, which "should be the central focus of pre-dissertation coursework." (Boote & Beile, 2005, p.3) Finally, providing students with repeated exposure to a topic, through a combination of web-based instruction and class lecture, would offer better learning outcomes compared to learning through a face-to-face lecture alone (Beile & Boote, 2004; Zhang, Watson, & Banfield, 2007).

A module prototype and data collection tools, such as surveys and tests, were created by the author and reviewed by three peers for constructive criticism. The three peer reviewers were one ETEC master's student, one ETEC advanced doctoral student, and one ETEC PhD graduate. The prototype module was then revised based on their feedback, and the revised version was further reviewed by two ETEC professors, one who taught the seminar in spring 2013 and another who taught the seminar in spring 2014. The instructor review focused on the content of the instructional module, and they made sure that the content of the instructional module and the class lecture on prospectus writing in the seminar was consistent. The final version of the module prototype was then reviewed through a small group testing, which was the final piece of the formative evaluation.

Test Participants

There were eight doctoral students enrolled in ETEC 750e in spring 2014, and they were recruited through email sent from the author. The instructor also encouraged the students to participate in the small group testing, although it was not required as a seminar assignment. Of the eight students, five successfully completed the small group testing.

Instructional Strategies and Module Design

The prospectus writing materials used in the ETEC 750e class lecture in spring 2013 were transformed into a web-based instructional module using Dick and Carey's Systems Approach Model (Dick, Carey, & Carey, 2005) as a framework. A key component of this model was its constant evaluation throughout the development process instead of at the end, which allowed the author to deal with design problems quickly to avoid major problems further down the road. In addition, to activate the information processing that would lead to effective learning, the author also incorporated learning strategies based on Gagne's Nine Events of Instruction (Gagné, 1985) throughout the module. Table 1 summarizes these nine instructional events in the left column and the associated mental processes in the right column.

The instructional module was then built using Google Sites, a free, single-click web page creation tool offered by Google Inc. The data collection tools were developed using Google Forms and incorporated into the module. The module consisted of the following four chapters, which were consistent with the content of the lecture in spring 2013; Chapter 1: Prospectus up close, Chapter 2: Literature reviewing and writing, Chapter 3: Research design and methodology, and Chapter 4: Problem statement and purpose statement.

Table 1. Instructional strategies based on Gagne's Nine Events of Instruction (Adapted from Gagné, Wager, Golas, & Keller, 2005).

Instructional Event	Instructional Strategy for the Prospectus Writing Module
1. Gaining attention	Side bar navigation as well as visuals and engaging graphics were employed to gain learners' attention.
2. Informing the learner of the objective	A learning objective provided in each chapter clarifies the knowledge and skills that were expected to gain. Providing clear learning objectives would prevent students from establishing their own expectations that might not be consistent with what the instructor had in mind.
3. Stimulating recall of prerequisite learned capabilities	This module was designed in a way that students could relate new learning to previously acquired knowledge or skills on a topic, which would make their learning more meaningful.
4. Presenting the stimulus material	To enhance the retention of information, the module content was organized into meaningful chunks, and examples produced by former ETEC 750e students were provided.
5. Providing learning guidance	Examples of providing learner guidance included the use of examples produced by former ETEC 750e students that were relevant and meaningful to the module learners.
6. Eliciting performance	Once the learners had sufficient learning guidance, they were given an opportunity to practice learned concepts through quizzes by which the actual internal integrating event of learning takes place.
7. Providing feedback about performance correctness	Embedded tests with immediate feedback were provided to confirm the correctness of their performance. If the learners have yet to grasp a concept or idea, the feedback would give them more information, which would enable them to correct their own mistakes.
8. Assessing the performance	At the end of this module, learner performance was assessed by the post-test. This helps the instructor determine if the designed learning had occurred.
9. Enhancing retention and transfer	Once the knowledge and skills had been learned, the learners would be required to apply such learned concepts, rules, and higher-order skills in the prospectus writing assignment and practice their retrieval. Such practice enhances retention and transfer of learning.

Data Collection Tools

To assess student learning on prospectus writing, a pre-test, embedded-tests, and a post-test were incorporated into the module. The pre-test was designed to determine learners' baseline knowledge about the concept. The embedded tests were included to provide learners with immediate feedback on their progress. Questions in the embedded tests were parallel to those in the pre-test, but used different wordings or different scenarios. Answer options for the embedded tests were also presented in a different order from the pre-test. Finally, the post-test was designed to measure learners' understanding of the concept and their retention of the information gained from the module. The post-test was intended to parallel the pre- and the embedded-tests, though the wording and scenarios in the post-test

were changed to avoid a learning effect from previous tests. All questions for these tests were constructed in a single answer, multiple-choice format, with only one correct answer, to save time and allow for quick feedback. A demographic survey and a feedback survey were also embedded in the module to gather information about the participants' background and to collect feedback on their learning experiences with the online module.

Procedures

The seminar instructor, in spring 2014, explained the purpose of this project to her students in Week 1 and encouraged them to complete the module by Week 4. The author also sent an e-mail invitation to the students and asked them to participate in the small group testing. The author used descriptive statistics to analyze quantitative data and thematic coding techniques to analyze the qualitative feedback collected from the small group testing.

Results

Target Learners

The demographic survey included 26 questions. Six questions asked about the participants' background and 17 questions asked about their prior knowledge and skill levels for research and prospectus writing. The questions were presented in a single answer, multiple-choice format. All eight students enrolled in the seminar completed the demographic survey and the data confirmed that the author's assumptions about learners' characteristics were correct. The assumptions included: most students in ETEC 750e were working professionals and had no or very little prior knowledge and skill for research and prospectus writing. These assumptions justified the decision to use web-based instruction to supplement class lecture.

Three participants were in their 20s, four in their 30s, and one in their 40s. Five of the eight students were female and three were male. Only one student was a full-time student, four students held a full-time position in higher education and one in primary education, and two participants were graduate assistants working 20 hours per week on campus. As for their prior knowledge and skill base for research, the data indicated that most of them were novice level scholars at that time. In fact, most of them (n=6) had never published a peer-reviewed journal article or a book chapter prior to taking ETEC 750e. In addition, a majority of them (n=7) had either never taken a graduate-level research course (n=1), only once (n=3) or twice (n=3). Nevertheless, many students claimed that they were familiar with some research techniques such as literature review (n=8), quantitative or qualitative data analysis (n=6), and data triangulation (n=8). Finally, only one student claimed to be familiar with prospectus writing before taking the seminar.

Small Group Testing Subjects

Of the eight students, five successfully completed the small group testing. Four of them were female and one was male. Two were in their 20s, two were in their 30s, and one student was in his or her 40s. Four of them held full-time teaching positions in higher

education, and one was a full-time doctorate student. Three students had never published a peer-reviewed journal article or a book chapter prior to ETEC 750e, though two students had published peer-reviewed papers or book chapters in the past. None of them claimed to be familiar with prospectus writing before taking the seminar.

Test Analysis

All the tests embedded in the module had the same structure and each included 21 questions. The first seven questions in Chapter 1 were designed to assess learners' knowledge on prospectus writing, the next six questions in Chapter 2 assessed learners' knowledge on conducting literature review, the next six questions in Chapter 3 measured their knowledge on research design and methodology, and the last two questions assessed their knowledge on developing a problem statement and a purpose statement. Table 2 shows a summary of mastery percentages for each question on each test. Based on their prior knowledge and skill levels for research, and their familiarity with prospectus writing, the author decided that a score of 60% for each question on the post-test was satisfactory.

Table 2. Summary of mastery percentages on the pre-, embedded-, and the post-test.

Chapter #	Question #	Pre-module Mastery (%)	Embedded Mastery (%)	Post-module Mastery (%)	Knowledge Gain (%)
Ch 1	1(1)	100%	100%	100%	0%
	1(2)	100%	100%	100%	0%
	2(1)	60%	100%	100%	40%
	2(2)	100%	100%	100%	0%
	3(1)	80%	80%	100%	20%
	3(2)	100%	100%	100%	0%
	4	100%	100%	80%	-20%
Ch 2	5(1)	100%	100%	100%	0%
	5(2)	40%	100%	80%	40%
	6(1)	60%	100%	40%	-20%
	6(2)	80%	100%	40%	-40%
	7(1)	60%	100%	80%	20%
	7(2)	80%	100%	100%	20%
Ch 3	8(1)	80%	100%	80%	0%
	8(2)	60%	100%	60%	0%
	9(1)	60%	100%	100%	40%
	9(2)	60%	100%	60%	0%
	10(1)	100%	100%	60%	-40%
	10(2)	60%	100%	40%	-20%
Ch 4	11	60%	100%	100%	40%
	12	100%	100%	80%	-20%

Note. A cell highlighted in yellow represents unsatisfactory and pink represents a problematic question.

In Table 2, cells highlighted in yellow are unsatisfactory and those in pink are problematic questions. All but three questions exceeded 60%. The three problematic questions were numbers 6(1), 6(2), and 10 (2), all of which had only 40% mastery. Question number 6 asked students to fill-in the blanks for the following sentence: "Some of the reasons for conducting literature review include identifying gaps in the literature, (1), carrying on from where others have already reached, avoiding reinventing the wheel, and (2)." Each question had four answer choices. (b) "Putting your work into perspective" was the correct answer for question 6(1), but two students selected (a) "giving a brief background to the problem" and one student selected (c) "demonstrating your knowledge on the topic." For question 6(2), (a) "identifying methods that could be relevant to your project" was the correct answer, but three students selected (d) "establishing the importance of your study." All the answer choices might be confusing for novice student researchers. However, a list of the correct answers was provided in Chapter 2, and these students had satisfactory scores on both the pre-test and the embedded-test. Therefore, it is possible that they did not pay attention to the questions and made mistakes. Nevertheless, it is recommended to revise the distracters in the tests to make it easier for learners to answer these questions.

Another problematic question was number 10(2), which asked students to find the best approach to the following scenario: "I created an online module on how pregnant women can practice healthy eating habits. In order to understand how five pregnant women who took the module can make better choices regarding nutrition because of the module, I should use (1) to gather data and (2) to analyze the data." Both questions had four answer choices and correct answers were (a) interview for (1) and (a) thematic coding analysis for (2). However, three students selected incorrect answers. Given that they selected correct answers on previous tests, it is possible that they did not pay attention to the scenario, which was different from the one used in the previous tests, and made mistakes.

Six questions that showed negative knowledge gains were question number 4, question number 6, question number 10, and question number 12. Given that all students selected correct answers for questions number 4 and 12 in the pre-test and the embedded-test, the selection of incorrect answers to these two questions in the post-test suggested the participants' lack of attention to the different scenarios.

Feedback on the Prospectus Writing Module

The feedback survey included ten reflection questions using a Likert-scale with 4, 3, 2 and 1 being assigned to "Strongly Agree," "Agree," "Disagree," and "Strongly Agree" respectively. Table 3 summarizes students' responses to the questions in the survey. The average score for all the reflection questions was 3.22, which indicated that the participants perceived the instructional module positively and felt that it helped them learn the concept and prepare them for the prospectus writing assignment, which was the final product of the seminar.

As for the qualitative feedback, the top two responses for the question asking what they enjoyed the most about the module were "organization and presentation of the module" (n=4) and "having samples and examples" (n=2). They commented that the information

provided in each chapter was well organized and the presentation was constant across the module, which made it easier for them to follow the instructions and check their progress from one chapter to the next. On the other hand, the top two responses for why they did not enjoy about the module were "length of the module" (*n*=2) and "lack of graphics or tutorial videos" (*n*=2). One student stated that it took him or her about two hours to complete the module and suggested making it shorter. At the same time, however, another student commented that the module was easy and suggested having a little more depth to the module content.

Table 3. Summary of responses to the post-module survey.

Reflection Questions	Average Score
This module was easy for me.	3.00
This module helped me learn how to write a prospectus.	3.20
This module was beneficial to me.	3.20
This module was organized.	3.60
The self-check questions in the module helped in reviewing the content.	3.20
The length of the module was reasonable.	3.20
My level of understanding of the prospectus writing has increased from this module.	3.20
I feel confident in planning and writing a prospectus for ETEC 750e.	3.20
I feel comfortable with planning and writing a prospectus for ETEC 750e.	3.20
I would recommend this module to all students in ETEC 750e.	3.20
Overall Average	3.22

Discussion

Student learning on prospectus writing with the online module resulted in average mastery percentages for the pre-test and the post-test at 78% and 81% respectively. The results indicated that the module was, for the most part, effective in gaining knowledge about the concept. Furthermore, all embedded test questions, except for question 3(1), received perfect scores, indicating that the students were engaged in their learning while taking the module and the embedded-test in each chapter. This data suggested that the strategies used in the instructional module were effective in guiding them to completion.

Nevertheless, the results also suggested that even a self-paced, web-based format could be challenging for some part-time doctoral students. Though the module was designed to be completed in four weeks, most students started the embedded-test in Chapter 1 later in Week 4 and spent little time on completing the module. In fact, one student stated that it took him or her for two hours to complete the module. Some mistakes made in the post-test, as was reported in the test analysis section, was evidence of students rushing to get the module done by the end of Week 4. When web-based instruction is used in a pre-dissertation course such as this seminar, it is therefore recommended that an instructor set deadlines for each chapter, each test, and each survey respectively, instead of setting one deadline for the entire module. This ensures that students will take the time necessary to learn the concept and expand their knowledge. In addition, adding more graphics and tutorial videos is also recommended to keep students engaged in their learning.

Finally, the small number of participants was one of the limitations for this project. It would have been desirable to have more participants in order to make general conclusions, and further study with a larger sample size would be recommended. Furthermore, collecting data on student learning on prospectus writing at the end of the semester is also needed for determining whether repeated exposure to the topic, through a combination of web-based instruction and lecture, contributed to improved concept attainment, and ultimately, better learning outcomes in the seminar.

Conclusion

This small-scale instructional design project demonstrated possibilities and challenges of using web-based instruction to supplement a face-to-face lecture in a pre-dissertation course. A self-paced, web-based instructional module on prospectus writing was created and used to supplement the class lecture in order to teach ETEC 750e students how to effectively write a prospectus. To ensure the quality of the prospectus writing module, a formative evaluation, comprised of peer-reviews, instructor-reviews, and a small group testing, was implemented while a prototype module was being developed.

Five students enrolled in ETEC 750e, in spring 2014, completed the small group testing. All participants, who were not familiar with prospectus writing prior to taking the module, had some level of knowledge gain on the concept, which increased their confidence in planning and writing a prospectus for the seminar. The small group testing results provided evidence that the prospectus writing module was, for the most part, effective in gaining knowledge on the concept. However, further study with a larger sample size is needed in order to make general conclusions.

Creating a self-paced, web-based module for dissertation preparation can be challenging, especially when the majority of learners are working professionals with widely differing backgrounds and different skill levels for research. However, this project suggested collective benefits to a course instructor and students in using a combination of web-based instruction and face-to-face lecture format in the context. The author hopes that faculty members teaching those "full-time leaders, part-time learners" will explore the potential of web instruction as a supplemental teaching resource when re-evaluating the effectiveness of their pre-dissertation courses.

References

Beile, P. M., & Boote, D. N. (2004). Does the medium matter?: A comparison of a Web-based tutorial with face-to-face library instruction on education students' self-efficacy levels and learning outcomes. *Research Strategies*, *20*(1–2), 57–68. doi:10.1016/j.resstr.2005.07.002

Boote, D. N., & Beile, P. (2005). Scholars before researchers: On the centrality of the dissertation literature review in research preparation. *Educational Researcher*, *34*(6), 3–15. Retrieved September 8, 2013, from http://www.jstor.org/stable/3699805

Dick, W., Carey, L., & Carey, J. O. (2005). *The systematic design of instruction* (6th ed.). Boston, London: Pearson/Allyn & Bacon.

Gagné, R. M. (1985). *The conditions of learning* (4th ed.). New York, NY: Robert Woodbury.

Holmes, B. D., Seay, A. D., & Wilson, K. N. (2011). Re-envisioning the dissertation stage of doctoral study: Traditional mistakes with non-traditional learners. *Journal of College Teaching & Learning (TLC)*, *6*(8). Retrieved September 15, 2013, from http://www.journals.cluteonline.com/index.php/TLC/article/view/1109

Institute of Education Sciences. (2011). Projections of education statistics to 2020. Retrieved September 15, 2013, from http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2011026

Merriam, S. B. (2002). Andragogy and self-directed learning: pillars of adult learning theory. *New Directions for Adult and Continuing Education*, *2001*(89), 3–14. doi:10.1002/ace.3

Zhang, L., Watson, E. M., & Banfield, L. (2007). The efficacy of computer-assisted instruction versus face-to-face instruction in academic libraries: A systematic review. *The Journal of Academic Librarianship*, *33*(4), 478–484. doi:10.1016/j.acalib.2007.03.006