

Comparing Student Satisfaction with Two Types of Reusable Learning Objects in an Online Nurse Practitioner Course

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Abstract

The use of reusable learning objects in online nursing education is not new, but few studies have compared different types of learning objects. This study is a comparison of two types of learning objects in sample of nurse practitioner students to help illuminate the more effective type from the student perspective. Data were collected using an online standardized survey for evaluating learning objects. Statistical differences between the students' satisfaction rating with the two types of learning objects were minimal. Informative information resided in the narrative responses for each type of learning object. Student responses reflected that the interactive learning objects were helpful in learning the content, but familiarity with the delivery method and technical issues were barriers, particularly for the interactive learning objects. The findings provide essential baseline information for further study in the most effective learning object type for online education.

There has been an increasing use of online modalities in nursing education at the graduate level in nurse practitioner programs. While online education is viewed as a method to increase enrollment and availability of nurse practitioner programs to a larger geographic area (Fitzgerald, Kantrowitz-Gordon, Katz, & Hirsch, 2012), the actual educational content can vary due to availability of computer hardware, computer software, and faculty expertise with creating online content (Bonnell & Vogel Smith, 2010). Although online education is not a new concept in health care and nursing education, there has been little research to determine student satisfaction of specific methods of online content delivery, particularly at the graduate level. This article describes a research study of student satisfaction ratings with two types of online content delivery: an interactive type of online content and a static narrated type of content.

Reusable Learning Objects

The contemporary health professions literature of online content delivery reveals the concept of distinct learning units known as learning objects (Ruiz, Mintzer, & Issenberg, 2006) being utilized as an innovative teaching strategy (Jess, Taleff, Payne, Cox, & Steele, 2006). The literature further defines the term reusable learning object (RLO) as a stand-alone reusable type of electronic-learning (e-learning) that is designed to impart information about a specific learning objective (Blake, 2010). The focused nature of the RLO sets it apart from other types of expansive e-learning content. In addition, RLOs usually contain high quality graphical displays and audio (Lymn, Bath-Hextall, & Wharrad, 2008), as well as narrated components (Alexander, Horney, Markeiwicz, & MacDonald, 2010), although there are no set standards for RLOs.

This study defines RLOs as two types: interactive reusable learning objects (IRLOs) that require interactivity with the presentation on the part of the student, and a static reusable learning object (SRLO) which are similar to a short narrated lecture. Although several articles in the health care arena discuss RLOs (Blake, 2010; Conroy, 2007; Jesse, Taleff, Payne, Cox, & Steele, 2006; Leonardi-Bee, 2007; Lymn, Bath-Hextall, & Wharrad, 2008, Taleff, Salstrom, & Newton, 2009) there remains a paucity of research on the evaluation of RLOs that compares student satisfaction with content delivery using an IRLO and a SRLO.

Specific Aims and Research Questions

The aim of this study is to explore student satisfaction ratings using two types of online content delivery: IRLOs and SRLOs. The research question underlying this study is: Is there a difference in IRLO and SRLO student satisfaction ratings?

Background

The use of online learning, or e-learning, is becoming more common in nursing education with the increasing availability of learning management systems, lower hardware costs, and increased internet communication speed (Little, 2008). Online education is cited as a way to increase enrolment (Parker & Wassef, 2010), and decrease geographical disparities (Windle, Wharrad, McCormick, Lavery, & Taylor, 2010). Although nursing programs are increasingly using online material in courses, the types of content delivery methods vary greatly (Cuellar, 2002). Studies in higher education support the position that online education produces higher student satisfaction (Lim, Kim, Chen, & Ryder, 2008; Palmer & Holt, 2008), and can be used as an effective method to increase competency (Atack & Luke, 2008). Although health science research shows that online education has increased flexibility and convenience for students (Dyrbye, Cumyn, Day, & Heflin, 2009) and produced satisfactory and effective results (Gerkin,

Taylor, & Weatherby, 2009), the research has not focused on a particular online content delivery method.

The benefits of RLOs usage in nursing education include an increase in the understanding of curricular content and student confidence (Lymn, Bath-Hextall, and Wharrad, 2008) and greater flexibility (Blake, 2010). An asset of using IRLOs is the development of active learning among nursing students due to their interactive design. The interactive nature of IRLOs challenge the use of online education content delivery methodologies, such as static recorded lectures, that are currently employed at many institutions (Alexander, Horney, Markeiwicz, & MacDonald, 2010; Lymn, Bath-Hextall, and Wharrad, 2008). Nursing education research has indicated active learning produced more effective learning results as opposed to passive learning found in the traditional lecture approach (Bevis, 1989; Chickering & Gamson, 1987; Phillips, 2005; Rounds & Rappaport, 2008). However, despite the benefits of IRLOs, previous studies of online nursing education research lack a differentiation between types of RLOs and their effect on student satisfaction.

Theoretical Framework

The guiding theoretical framework is based on adult learning theory of Knowles, Hoton, and Swanson (2005) in which adult learners are orientated toward task-centered or problem-centered learning. Since the RLOs are defined as discrete stand-alone learning objects, the adult learning theory framework supports the use of RLOs in adult education. Another aspect of adult learning theory that is applicable to this study is the role of the learner's experience as an aspect of adult learning (Knowles, Hoton, & Swanson). This is particularly important in the context of the participants in this study are master's level students and have had a wide range of didactic and clinical learning experiences.

Methods

Research Design

This study uses an exploratory descriptive design.

Ethical Concerns

The researchers received approval of the study design from the Institutional Review Board (IRB). No identifiable data were collected in this study, and all responses were collected using an anonymous online survey system. Consent was implied by completing the online survey.

Sample and Setting

The researchers recruited a non-probability convenience sample of family nurse practitioner students enrolled in an online nurse practitioner courses at a large health science university in

Southwestern United States during September, 2011 to April, 2013. A recruitment script for students to participate in this study by completing an online survey was posted in the Blackboard learning management system. All students enrolled in the courses had the opportunity to participate.

Data Collection Instrument

The study utilized a questionnaire previously developed by the Centre for Excellence in Teaching & Learning in Reusable Learning Objects, known by the acronym RLO-CETL, which is a partnership of London Metropolitan University, the University of Cambridge and the University of Nottingham. The RLO-CETL Learning Object Questionnaire was designed to measure participant satisfaction and usage of RLOs in online educational environments (RLO-CETL, 2013). Included in the quantitative rating scales are items related to participant satisfaction with educational quality and learning object attributes. Additional data was garnered with items regarding the participant's computer confidence. Qualitative portions of the questionnaire expound on technical difficulties, usefulness of the RLO, and any other participant comments.

RLO Development

This study used specific software, Adobe Captivate, to produce the IRLO and narrated screen capture software, Panopto, to create the SRLO. For the module containing the SRLO, the course faculty developed a narrated slide presentation that was recorded in a short focused lecture format using the Panopto format that does not allow student interactivity with the presentation.

The module containing the Adobe Captivate developed IRLO included features to enhance learning such as short quizzes, rollover areas using text and images in the presentation to emphasize content, narration based on student interaction with the presentation, and short video clips embedded within the presentation. Additional learning tools in the IRLO allowed students to link to external websites through embedded links without closing the presentation or the Blackboard 9.1 LMS windows. Lastly, animations and text emphasis were integrated into the IRLO to draw participant attention to specific content.

Although the literature surrounding the use of Adobe Captivate produced presentations is sparse, Vaughan (2009) found that the use of Adobe Captivate presentations facilitated specific learning needs while reducing teaching load. An advantage to the use of Adobe Captivate is that content can be developed with a high level of interactivity using a program that is intuitive for faculty to use (Vaughan). Adobe Captivate can readily incorporate previously developed Microsoft PowerPoint lecture slides (Adobe, 2013), while allowing for a level of learner

interactivity that is not possible with narrated PowerPoint slides or static content delivery systems such as Panopto (Panopto, 2012).

Procedures

The content of the nurse practitioner courses at the study site is incorporated into a topical modular design using the Blackboard 9.1 learning management system (LMS). Each module contains a similar format and includes: a narrative introduction, module learning objectives, required readings, and the specific online content which was either a recorded narrated SRLO, or IRLO. For this study, students in family nurse practitioner courses evaluated the online content delivery contained in two separate topical modules: one using a SRLO developed with Panopto, and one using an IRLO developed using Adobe Captivate. The contact time for each type of RLO is about 1 week in duration, although students had access to the RLOs for several weeks during the term. After experiencing the specific RLO type within a module, student participants evaluated the RLO content delivery using the anonymous online survey system.

Data Analysis

The quantitative student survey results were uploaded into the Statistical Package for Social Sciences (SPSS) for analysis of demographic responses, frequency of responses, and survey response differences of responses between the two types of RLOs. The qualitative narrative responses that were captured with the online survey were analysed using a content analysis design (Weber, 1990), which is useful in categorizing and counting responses (Neuendorf, 2002).

Results

Study participants completed the RLO-CETL questionnaire at the completion of two separate modules containing one type of RLO. As such, there are two resulting sets of data: one related to the IRLO and one set related to the SRLO. The researchers cannot assume that the same student completed both surveys since the surveys were anonymous.

Sample Demographics

Since there were questionnaires for each type of RLO, it is unknown if the same participant answered both questionnaires. In this light, the results are discussed with the understanding that participants may not have completed both the IRLO and SRLO questionnaires. A total of 74 participants completed the IRLO survey and 28 participants completed the SRLO survey with both survey groups having a majority age category of 25 to 35 years old. The two participants groups were also overwhelmingly female: 90% for IRLO survey and 96% for SRLO survey.

Technical Difficulties

The RLO-CETL questionnaire ascertains difficulty in accessing or downloading the specific RLO with the use of a dichotomous yes/no question. 18.9% of the IRLO sample indicated some difficulty in downloading or accessing the RLO compared to 7.4% of the SRLO sample and is further expanded upon in the narrative response results.

Educational Quality Items

The RLO-CETL questionnaire contains 15 items (Table 1) related to the participant's perception of the educational quality of the RLO using a 4 level Likert scale ranging from 1 (strongly agree) to 4 (strongly disagree). The range of means for the items was 1.5-1.9 (SD range 0.7-1.1) for the IRLO and 1.5-1.7 (SD range 0.5-0.6) for the SRLO which indicates a central tendency on the 'agree' category for each of the items for both types of RLOs.

Table 1: Education Quality Items of RLO-CETL Questionnaire

The Learning Objects associated with this module were clear about their purpose or objectives
The Learning Objects associated with this module were easy to navigate
The Learning Objects introduced new concepts/language clearly
I would recommend these Learning Objects to another person with similar learning needs
I would like more of these Learning Objects in other modules
The Learning Objects' content was appropriate for the course
The Learning Objects were well integrated with other parts of the module
The Learning Objects were pitched at the right level
I enjoyed being able to learn on my own
The Learning Objects associated with this module were enhanced by images, audio, video and/or animations
The Learning Objects associated with this module were clear about pre-requisite knowledge
I intend to use the Learning Objects from this course again
Using the Learning Objects helped me to address specific gaps in my knowledge
Using the Learning Objects helped me to meet the requirements of the course/module
Using the Learning Objects helped me to retain knowledge in this area
The Learning Objects associated with this module were clear about their purpose or objectives

RLO Attribute Items

The RLO-CETL questionnaire measures the participant's rating of the various attributes for the RLO (Table 2) using a 4 level Likert scale ranging from 1 (very important) to 4 (not important at all). The item means ranged from 1.2-1.7 (SD range 0.6-0.8) for the IRLO and 1.2-1.8 (SD range 0.4-0.8) for the SRLO indicating that participant ratings centered on 'important' for all 7 items in both response groups.

Table 2: RLO Attribute Items RLO-CETL Questionnaire

Visual components (e.g. video, animations)
Audio/commentary
Interactivity
Assessment/self-test exercises
Access anytime
Access anywhere
Working at my own speed

Computer Confidence

The RLO-CETL questionnaire measured the computer confidence of participants using a 4 level Likert scale ranging from 1 (very high) to 4 (very low) in regards to confidence with computers, office suite software, web tools, and web multimedia. In both response sets for this particular item cluster, the IRLO and SRLO had similar means and standard deviation calculations centering on the 'very high' to 'high' rating indicating that the participants were fairly confident in their computing capabilities in each of the participant groups.

Statistical Analysis of Differences

Due to the small sample size, the study analysis used a two tailed Mann-Whitney U statistical test to determine if there was a significant difference between the responses for the IRLO and SRLO on each item examining the educational quality, RLO attributes, and computer confidence. The resulting analysis indicated that item ratings were not significantly different between the IRLO and the SRLO groups for any one item: all resultant p values were greater than .05 for each of the RLO-CETL quantitative items.

Questionnaire Narrative Comments

The RLO-CETL questionnaire includes three narrative comment sections that participants can complete. The first narrative question asked participants to state any technical or download issues that occurred during the use of the learning objects. The IRLO comments indicated technological issues with the length of download time, inadequate audio levels, and lack of consistent navigation within the presentation. The SRLO did not have any narrative responses for this particular question, although SRLO technical issues were alluded to in a subsequent narrative question.

The second narrative question asked participants to indicate how they felt the RLO could be improved. For the IRLO, there appeared to be audio issues, similar to the first narrative

question, and participant's experienced navigational issues particularly in the quiz portion of the presentation. Similar to the first narrative question, there was an issue of long download times, which could be reflective of internet connectivity, file size, or both. In addition, participants stated that the IRLO display size (640 by 480 pixels) was too small. An interesting finding in this set of narrative responses was that some participants stated the IRLO was a 'great presentation' and 'perfect', and 'very useful'. Although there were fewer respondent comments to the SRLO question, some participants stated they wanted to have more interactivity that was similar to the IRLO and that the SRLO had audio issues.

The third narrative question asked participants if the RLO was useful. The particular wording for this question in the questionnaire solicited terse responses. One participant stated the IRLO was 'somewhat' useful whereas 30 indicated positive or 'yes' response compared to 10 statements affirming that the SRLO was useful to participants.

The last response set was an open-ended comment section that elicited the least number of responses ($n=5$). The question asked participants to reflect on the technical issues and the resulting comments were a reflection of previously mentioned IRLO technological issues such as navigating the presentation and download time.

Discussion

Survey Results

A limitation of the study is the relatively modest sample size, particularly with responses to the SRLO group. A larger sample size is needed for a more thorough comparison between the two types of RLOs, and to determine significance of any differences. Study findings showed that participants viewed both types of RLOs as having nearly equivalent education quality ratings. Attribute ratings in an overall computer-confident sample and statistical analysis did not support a significant level of difference on the item ratings between groups. If subsequent samples support this study's current findings, this could indicate that learner's perceive IRLOs as equivalent to SRLOs as an educational tool.

The narrative comments reflected that certain components of the IRLO were useful to participants, specifically the ability to have graded review questions embedded at the end of the presentation. Overall, the IRLO did have supportive narrative responses that reflected the usefulness of the IRLO.

The study findings did not address educational outcomes on test items based on the RLO used in a particular module. Participants used multiple resources, which included required readings from textbook and articles as specified in the modules, and could have used other

resources that a participant discovered and utilized on their own. Due to the multitude of resources available to participants, it would be difficult to determine with certainty if the participant gained specific knowledge from the RLO or from other resources.

Many unmeasured factors may have played a role in the results, for example, familiarity with the type of RLO may have affected respondent comments and ratings. Although participants had previous exposure with each type of RLO, the amount of previous exposure time with each type of RLO was not measured. In future research, detailed information about previous exposure to each type of RLO may lend insight to rating differences and narrative comments related to the two RLO types. In addition, it may be an assumption that participants desire an interactive learning environment; that is, the participants may have been accustomed to passive learning lecture formats which are emulated with the SRLO format.

With any type of internet learning experiences, there may be individual variations in internet connection speed, participant computer operating systems, and participant familiarity with specific aspects of required software settings. The study did not assess these factors that may have affected a participant's overall satisfaction with a computer learning experience. Although download issues were noted with the IRLO sample, it is uncertain if this was a significant factor in the comments as actual internet connection speed was not surveyed. Other hardware and software variances that may have impacted the RLO experience need to be measured. For example, the type of device the participants used to view the RLO (mobile, tablet, or computer) may have been a factor. In particular, since the IRLO is based the ability to use Adobe Flash Player, this may have been a limiting factor for some participants depending on the type of hardware used.

Limitations in the IRLO navigation and download time appear to be a barrier specific to the IRLO. The download time issue may be a reflection of the file size and connection speed. The IRLO navigational issue within the presentation may be due to unfamiliarity with the Captivate-derived IRLO or may have been an unanticipated incorrect pathway that did not display during the initial development testing of the IRLO.

Faculty Perspective

From a faculty perspective, the differences between the two development platforms are significant. The IRLO development does involve more time and effort from faculty, but this is due to the increased capabilities of the Adobe Captivate program. The interactivity of the IRLO, including interactive review questions, animated text, and rollovers are not possible in the Panopto system. Although Panopto does have basic audio editing ability, Captivate was found

to have finely detailed audio editing capabilities. In addition, although Panopto can capture video while recording, Captivate allows video clips to be easily captured or imported into a presentation.

Both programs used in this study to create the RLOs were relatively easy to use, and could leverage previously developed resources, such as recording or importing existing PowerPoint presentations into the RLO. However, Captivate presentations allow faculty to be more creative in adding other educational resources into the content of the presentation. Lastly, since Captivate uses a slide-based approach to the presentation development, analogous to PowerPoint. Revisions and edits to a Captivate slide are relatively straightforward to make, and do not require faculty to revise the entire presentation. The Panopto platform had some editing capacity, but the lacked detailed editing and the ability to correct a specific segment of the presentation.

Conclusions

Although the use of RLOs in online education is not new, comparisons between different types of RLOs and the student perception of the RLO has not been fully studied in the health sciences. This pilot study serves as a starting point for further research on RLOs created with readily available commercial programs. The interactivity of the IRLO in this particular sample was well received by participants; however, larger sample sizes are needed to determine if there is a statistical difference between IRLO and SRLO in regards to the participant's perception of the value as an educational tool. From a faculty perspective, the IRLO did allow for more creativity and flexibility while leveraging usage of existing presentations.

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Keywords: online education; learning objects; nurse practitioner education

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