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Currents in Pharmacy Teaching and Learning 8 (2016) 359–363

Currents
in Pharmacy
Teaching
& Learning

<http://www.pharmacyteaching.com>

Research article

Student perceptions of and performance in a blended foundational drug information course

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Abstract

Objectives: Assess and trend student opinions of online educational components utilized in a redesigned 5-week foundational drug information course. Comparison of performance on the final examination, course grade, and changes in standardized university course evaluations between 2012 and 2013 were the secondary objectives.

Methods: This course used narrated video instruction coupled with the use of a face-to-face weekly laboratory session. This project consisted of pre- and post-exposure surveys to allow for paired analysis of six opinion-based survey items using a five-point Likert scale. Secondary objectives were compared between the 2013 and 2012 entering classes by use of paired *t*-tests.

Results: Only matched pairs were analyzed for this project ($n = 65$ of 127 enrolled students; 51.2%). Changes between mean pre- and post-survey results indicated a decline in student favorability for traditional lecture styles (difference = -0.49 points; $p < 0.05$) and a decline in the importance of face-to-face interaction with instructors outside class (difference = -0.46 points; $p < 0.05$) while demonstrating increased favorability for use of online video demonstrations as an acceptable substitute for in-person demonstration of skills (difference = 0.34 points; $p < 0.05$) and increased rating of overall preference of online learning compared to traditional modalities (difference = 0.44 points; $p < 0.05$). Standardized course evaluations did not differ between 2012 and 2013. Mean final exam scores significantly increased from 84.86% in 2012 to 88.99% in 2013 ($p < 0.05$), but no difference between mean course grades (94.03% and 93.62%, respectively; $p > 0.05$).

Conclusion: Blended course design is an effective format for introductory skills-based professional pharmacy courses.

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Keywords: Blended learning; Drug information; Pharmacy education

Introduction

Online technology can allow for efficient delivery of facts, creating time for active learning opportunities during classtime.¹ Furthermore, while evidence for use of blended

course or curricular designs are accessible,² use of Internet-based activities in a foundational drug information course is uncommon based upon the published literature.^{3,4} Due to student feedback from annual assessments and to accomplish institutional strategic objectives, the foundational drug information course for first-year (P1) pharmacy students at McWhorter School of Pharmacy, Samford University was revised into a blended learning model for fall 2013. Prior offerings of the course were conducted in a strictly face-to-face manner.

“Blended learning” can be defined as the combination of different pedagogical media (e.g., technology and activities)

Abbreviations: P1, first professional year LMS, learning management system

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<http://dx.doi.org/10.1016/j.cptl.2016.02.013>

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to create an ideal training environment.⁵ Adjunctive media such as technology is not to be viewed as a replacement for face-to-face interaction, but rather as a supplement to this endeavor and to also promote self-directed learning in professional students.⁵ The primary purpose of this project was to assess and trend opinions about student learning preferences in this five-week (one semester credit hour) course. Secondary objectives compared the mean final examination score, overall mean course grade, and changes in standardized university course evaluations between the 2012 and 2013 offerings of this course.

Methods

The modified blended course was a one credit-hour required course delivered during the first five weeks of the P1 pharmacy curriculum. A blended course, for the purposes of this research, is defined as a course that consists of asynchronous delivery of didactic content coupled with face-to-face active learning/laboratory exercises. The course consisted of a series of narrated videos accessed online via a learning management system (LMS, Moodle[®] Version 2.4.5, Perth, Australia) in conjunction with face-to-face weekly laboratory sessions to reinforce important concepts presented in the videos. Using the previous year's course learning objectives as the basis for content development, videos were produced using a combination of screen capture software (Camtasia[®] for Mac version 2.4.0, Techsmith[®], Okemos, MI), video recording of simulated interactions, and to a lesser extent, narrated slide presentations (see [Appendices A and B](#) for course learning objectives and course calendar, respectively).

Since its initial offering as a face-to-face course in the fall of 2009, the calculation of the course grade for the foundational drug information course consisted of the student laboratory grade (30%), student weekly quiz grade (30%), student final examination grade (30%), and student participation/attendance (10%). Weekly online content was segmented into multiple videos of 6–12 minutes duration, in which each video focused on specific learning outcomes. On average, students watched five videos per week, occupying approximately 85 minutes of their time. The face-to-face laboratory sessions took place Monday through Thursday afternoons, with approximately 42 students per three-hour session. These sessions were designed to allow students to reinforce and apply the material that was presented in the online videos the previous week and consisted of exercises dedicated to paraphrasing and citing references, searching drug information databases, searching PubMed/Medline and answering a drug information question utilizing the systematic approach to answering drug information questions.⁶ Drug information questions utilized for laboratory exercises consisted of questions originally answered by the school's drug information center in addition to simulated questions.

In order to encourage student accountability with respect to timely completion of required online course activities and assessments in a specific order, we utilized the built-in conditional release properties within the LMS. On the first viewing of each video, playback controls were disabled to ensure that students did not “fast-forward” to the end of the video. At the conclusion of each video, students were presented with a formative single-question quiz. Incorrect answers triggered the opening of a window with formative feedback, and students were allowed to reattempt the quiz. Successful completion of the quiz served as a tracking process for completion of the activity and also as a control mechanism to reveal the following video in the series. After viewing each video and correctly answering each formative quiz question for all videos in the series, a link for a timed (10 minute) summative quiz was revealed to the student. Students were able to use their notes on summative weekly quizzes. Scrambling the question order and the answer choices discouraged collaboration among students while taking the online summative quizzes. Furthermore, students were not allowed to return to a question once it was presented. Completion of the summative quiz was required for laboratory attendance. Laboratory attendance was required in the course.

Summative quizzes utilized in the 2013 course offering were identical to quizzes utilized in 2012 and accounted for 30% of the total course grade. Since examinations are not returned to students (school policy), the final exam utilized in the 2013 course offering was also identical to the final exam utilized in the 2012 course, with the exception of two questions that were re-worded for the 2013 course to improve content clarity. The exam was a paper-based exam that consisted of 40 multiple-choice questions that were equally weighted at 2.5 points per question. The final examination accounted for 30% of the total course grade.

During the P1 student orientation program one week prior to the commencement of classes, P1 students were asked to complete an online “pre-exposure” survey regarding previous experiences with and perceptions of online courses. Similarly, after the completion of the course, students were asked to complete a “post-exposure” survey with a similar format as the pre-exposure survey, but also included specific questions related to course outcomes and activities. Students used a unique numeric identifier which allowed for paired comparisons of the pre- and post-exposure survey results. An electronic survey (Qualtrics[®], Provo, UT) link for the pre-exposure survey was distributed via email to the P1 class during new student orientation and the post-exposure survey link was distributed after the course final exam through the same process. A five-point Likert scale (range: $-2 =$ strongly disagree, $-1 =$ disagree, $0 =$ neutral, $+1 =$ agree, and $+2 =$ strongly agree) was used for questions related to student perceptions and attitudes. Paired *t*-tests were used to compare pre- and post-exposure survey data and served as the primary endpoints for this study. Standardized student course evaluation results, final examination scores, and overall

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