

Opinion

Student perceptions of the use of pre-recorded lecture modules and class exercises in a molecular biology course[☆]

Samit Shah, PhD^{a,*}, Arthur G. Cox, PhD^b, Martin M. Zdanowicz, PhD, MEd, MA^c

^a Department of Biopharmaceutical Sciences, Keck Graduate Institute School of Pharmacy, Claremont, CA

^b South University School of Pharmacy, Savannah, GA

^c University of Miami School of Nursing & Health Studies, Coral Gables, FL

Abstract

Objective: To describe the design, implementation, and assessment of a hybrid learning molecular biology course.

Design: Students were assigned to watch pre-recorded lectures (modules) prior to class. Class time was used for applying the theory in the modules to exercises designed to explore the material at a deeper level. Student perceptions of the use of modules and class exercises as a tool to enhance learning were examined using a survey with a 5-point Likert Disagree–Agree response scale.

Assessment: One hundred percent of the students participating in the survey indicated that the pre-recorded modules and class exercises helped enhance their learning, and that the hybrid course design effectively combined active and passive learning methods. Over 95% of the students indicated that the course design helped them to learn the material more effectively at all levels of Bloom's taxonomy compared to a traditional lecture-based course.

Conclusion: Providing students with modules allows them to review a recorded lecture multiple times and learn the course material at their own pace. Use of the modules also frees up classroom time that can then be used for active learning exercises and detailed application of the material. Students believed that combining pre-recorded modules with class exercises allowed them to become more actively engaged in the learning process and develop better understanding of the course material. Students also perceived that the hybrid learning approach in molecular biology promoted better recall, understanding, application, analysis, and integration of the material compared to a traditional lecture-based course.

© 2013 Elsevier Inc. All rights reserved.

Keywords: Pre-recorded lectures; Active learning; Molecular biology; Hybrid course

Introduction

Much of the curriculum in colleges of pharmacy has been historically taught through the use of live lectures in which factual information is “presented” via passive teaching methods.^{1,2} These lectures are typically much

longer than the average adult learners' attention span of 20 minutes.³ As a result, students can occasionally lose concentration midway through a lecture. In addition, live lectures do not give students the opportunity to pause and comprehend the material that was just presented. The ability to comprehend material before moving to the next topic can be critical when learning sequential course material, where the knowledge of basic concepts covered in the early portion of a lecture is essential to build understanding of the latter portion. One solution to overcoming these challenges is to provide students with a pre-recorded lecture (module), which can be downloaded and then viewed offline even without an Internet connection. This can allow students to pause multiple times through a lecture and learn

[☆]Financial disclosure: South University provided the fee required by the Institutional Review Board of St. Joseph's/Candler Health System to approve this study.

* Corresponding author: Samit Shah, PhD, Department of Biopharmaceutical Sciences, Keck Graduate Institute School of Pharmacy, 535 Watson Dr., Claremont, CA 91711.

E-mail: Samit_Shah@kgi.edu

the material at their own pace. Classroom time can then be used to facilitate active learning exercises that allow students to explore the course material at a deeper level and develop better comprehension. Several courses referred to as hybrid or blended have been described in the literature, in which part of the course is conveyed by electronic means such as pre-recorded or online lectures.^{4–12}

A number of approaches have been taken to achieve the goals of hybrid course instruction. The use of web-based pre-class coursework in combination with face-to-face instructor time is one approach.⁴ Other ways in which online content has been incorporated include the addition of online lectures and quizzes, online self-assessment quizzes and practice problems, online lectures paired with classroom problem-based learning, online student–tutor and student–student discussion, piloted multimedia modules, and virtual laboratory modules.^{5,6,8–11}

Thoughtfully designed hybrid courses can result in improved student learning and satisfaction and in greater flexibility for both the instructor and the students.^{5–7} For instance, one study examining a hybrid cardiovascular pharmacotherapy course found that student satisfaction was high, student preparation prior to class was increased, and long-term knowledge was increased.⁵ Another study on the use of blended learning in a basic pharmacokinetics course demonstrated evidence of student learning and enthusiasm for the approach. In that study, student enthusiasm for the hybrid design increased significantly over the six weeks that the course was taught, as the students became familiar with the teaching approach.⁶

This article describes the development and implementation of a hybrid molecular biology course for first-year pharmacy students at the South University School of Pharmacy.

Design

Molecular biology is a mandatory course for all first-year students at South University School of Pharmacy. It is offered as a sequel to Biochemistry I and II and covers fundamental molecular biology principles and techniques and their applications in drug development and pharmacy practice. The course is ten weeks long and meets three hours per week. The material for the course is divided into three blocks. Achievement of student learning outcomes is assessed through individual exams at the end of each block and through a comprehensive final exam. The hybrid learning method described in this article was implemented in the first block of the molecular biology course offered to students enrolled in winter 2011 (graduating class of 2013). A total of 166 students were enrolled in the course, which included 92 students on the Savannah campus and 64 students on a satellite campus in Columbia, SC. This was the first time that the course was taught using distance education technology. Classrooms were equipped with a Tandberg video teleconferencing system and several

monitors that allowed students to view the instructor, the notes through PowerPoint or whiteboard, and the other class. Each student was equipped with a microphone. When a student on either campus had a question, they pressed a button on the microphone in front of them. The classroom camera automatically zoomed in on the student using the microphone, thereby allowing students on each campus to see the student and hear the question.

Pre-recorded video modules were created by recording lectures in a classroom using a video content recorder system available at South University (TelePresence Content Server, Cisco Systems, Inc.).¹³ This system was designed to facilitate distance education. The instructor delivered a lecture using a PowerPoint presentation to an empty classroom. The entire presentation was recorded, along with the instructor's voice. Rather than record the instructor along with the PowerPoint presentation in a split-screen fashion, the system was set up to record only the PowerPoint presentation on the screen. Annotation equipment was integrated into the computer that was used to record the video modules. This consisted of an LCD display and wireless pen with integrated software (StarBoard T-17SXL Interactive Display, Hitachi, Ltd.).¹⁴ This equipment allowed the instructor to annotate slides and figures on the screen. It was extensively used to illustrate processes such as transcription and translation and to help student visualization. Annotation was also used to highlight important points on the screen. After the videos were recorded, the IT department at South University made the videos available for download by the instructor. The video files were exported in MP4 format. This format was determined to have an appropriate balance of file size and video quality for the intended delivery to personal computers through a wireless network. The average size of these files was 35 Mb for a one-hour module. The modules provided to the students varied in length from 55 to 70 minutes.

South University uses an electronic classroom management system (eCompanion, Pearson Learning Solutions) to administer courses and distribute course material such as slides and handouts to students.¹⁵ The MP4 video files were uploaded to eCompanion, and links were provided to students for downloading them to their personal computers. The modules could then be conveniently viewed offline. All the modules and PowerPoint presentations for the first block of the course were uploaded on the first day of the course. Students were required to watch the assigned pre-recorded modules prior to each class. A number of links to YouTube videos were also provided to the students to help them visualize processes such as transcription and translation.^{16,17} Use of YouTube videos as a supplemental tool is considered to be an innovative and effective strategy for enhancing student learning in health sciences and other disciplines.¹⁸

Individual exercises to be completed by the students during each class period were developed prior to the beginning of the course, based on the material in each pre-recorded module. The class exercises contained

Download English Version:

<https://daneshyari.com/en/article/353293>

Download Persian Version:

<https://daneshyari.com/article/353293>

[Daneshyari.com](https://daneshyari.com)