The Development of Two Anatomy and Physiology Courses that Allows Students to Complete Their Course Requirements at Home Using eScience Labs: Comparison Among Online, Hybrid and On-Ground Courses

Debra A. Rajaniemi
Goodwin College

Vicky Navaroli
Goodwin College

Follow this and additional works at: http://digitalcommons.goodwin.edu/hsc_fac_pres

Part of the Medical Education Commons, and the Online and Distance Education Commons

Recommended Citation
Rajaniemi, Debra A. and Navaroli, Vicky, "The Development of Two Anatomy and Physiology Courses that Allows Students to Complete Their Course Requirements at Home Using eScience Labs: Comparison Among Online, Hybrid and On-Ground Courses" (2013). Faculty Presentations. Book 1.
http://digitalcommons.goodwin.edu/hsc_fac_pres/1

This Research Poster is brought to you for free and open access by the Health Science at DigitalCommons@Goodwin. It has been accepted for inclusion in Faculty Presentations by an authorized administrator of DigitalCommons@Goodwin. For more information, please contact mnowlan@goodwin.edu.
The Development of Two Anatomy and Physiology Courses that Allows Students to Complete Their Course Requirements at Home Using eScience Labs: Comparison Among Online, Hybrid and On-Ground Courses

Debra Rajaniemi MS and Vicky Navaroli PhD
Department of Health and Natural Sciences

Abstract

A two semester online Anatomy and Physiology 1 & 2 course was developed with complete online instructions. The lab portion is distributed as “A Lab in a Box” provided by eScience. Students using eScience lab kits have the flexibility of online learning while completing comprehensive hands-on experiments at home. These experiments include dissections, blood typing, blood pressure, organ mechanics, bone and muscle identification, protein and enzyme analysis, histology, hormone testing, etc. eScience provides students with full-color lab manuals, customized kits, safety equipment, video tutorials, interactive animations, and exams at LMS. This course accommodates all learning styles giving the freedom students need to work at their own pace. Students are assessed by weekly material including discussions, comprehensive lab manual work, lecture and lab quizzes, lab reports, practicals, and lecture exams. The lab reports include pre- and post-lab questions as well as submission of pictures and videos of their experiments. The online lecture exams, lab practicals, and course content are generated through McGraw Hill’s software. All graded content is timed and extended times provided for students who need accommodations. Student responses are responsive and overwhelming. Students love the ability to work at their own pace, spend less time on travel, more quality time with their families and less out-of-pocket expenses. Students with test anxiety feel comfortable and relaxed working in the privacy of their homes. Pregnant students, full-time parents and students recovering from surgeries/illnesses can finish their coursework without taking a medical leave thus completing their course requirement.

Introduction

Our online Anatomy and Physiology 1 and 2 courses were developed to give students an alternative method for learning course materials. These online courses consists of lecture and lab components that fulfill all the requirements of the on-ground Anatomy and Physiology courses. It also gives students the full learning experience of a classroom while lectures and labs are completed at home. The lecture portion involves a weekly online discussion where students are required to post three days of the week with a minimum of two posts per day as well as completion of weekly assignments and weekly quizzes. Custom made lab kits are provided by eScience lab kits to allow students to have the flexibility of completing hands-on labs at home. With these lab kits, students are able to complete weekly written lab reports as well as lab quizzes based on the content learned from the experiments they performed. In addition, these courses accommodates many learning styles by providing various methods of lecture/lab content delivery (Powerpoints, videos/animations, online cadaver dissection and histology tools, etc.) giving the freedom for students to work at their own pace.

Methods

The lecture and lab content was developed using a backwards design approach to creating engaging and interactive units. The backwards design approach that identifies the goals and desired results for the learning content, second, designing assessments that show the students mastery of the content learned to account for student's performance, and finally, creating the remainder of the instructional strategies and methods within a learning plan (Wiggins & McTighe, 2001). Understanding by Design, Prentice Hall). For each chapter in the course, a concept map was created. The goals, essential questions, and desired results outcomes were identified (see chapter 9 and 11 concept maps). Assessments were then selected to reflect mastery understanding of the content related to the mapped concepts. The assessments included discussion postings, assignments, quizzes, lab reports, lab practicals and lecture exams. The quizzes, lab practicals and lecture exams are timed exams that matches the length of time given to on-ground students.

The instructional strategies and methods used for each chapter included PowerPoint presentations, audio/video files, animation files, APRevealed (virtual histology and cadaver dissection), eScience lab manual and animations, and hands-on labs.

The lab portion of the online course was designed using eScience lab materials. Lab experiments were selected based on the same labs performed in the on-ground classes. The online labs included both histology as well as dissections. All the online labs require students to be actively engaged on hands-on experiments. This was demonstrated by having students take pictures of the experiments they performed at home. Although students did not have access to microscopes at home, eScience provided a microscope for students to practice techniques of how to manipulate a microscope. Also, eScience provided virtual histology images that are similar to the histology slides viewed by on-ground students. eScience kits included safety materials and standards for students to perform the dissections and other lab experiments in a controlled environment.

Results

In all three formats of the courses offered (online, hybrid, and on-ground), the assessments of the students were similar. All three sections used the online learning tools for assignments, quizzes and practice modules. The students seemed to retain the same amount of information regardless of the learning style they used (Table 1).

For the lecture component, the online and hybrid students opened the same material and quizzes that were presented to the on-ground students. The online and hybrid students were able to participate in the forums through the discussion boards. All students in the online and hybrid courses are required to complete a minimum of 6 substantial posting per week. The on-ground students were presented the content in a lecture format, however, due to the large class size and time constraints it had to engage all students in discussion of the lecture content.

For the lab component, the online students were fully engaged in the lab exercises because they worked individually to complete the assignments. This allowed them to use more critical thinking skills to complete the content. The on-ground and hybrid students worked in groups where the content was learned through collaboration.

The online students were required to take pictures of the experiments they completed. For dissections, the online students had access to web-based resources to aid in completing the dissections (see Figures 1-3). Students on-ground had the help of the instructor for guidance and directions.

Visual aids were used in all groups. The on-ground and hybrid students had visuals supplied from the book publisher (McGraw Hill) and the fully online students used visuals supplied by eScience labs as well as the book publisher. All on-ground labs had the same content material. On-ground students worked with supplies and labs designed by the instructors whereas online students used lab materials designed by eScience labs (see Figures 1-3).

Both groups were able to meet the same course outcomes in both live classrooms as well as online courses. The results showed the assessments of their lab reports as well as quizzes and practicals. Comparable outcomes and results were found in all students (Table 1).

Conclusions

The eScience kits have been an excellent resource for students. Students were provided with a quality lab experience. So far feedback from the students using the eScience kits has been both positive and encouraging. Students found the kits easy to use because of the simple step-by-step instructions provided within the eScience lab manual. In addition to the eScience kits, students were required to use supplemental online tools throughout the course provided by eScience (video animations and interactives).

Additional tools were added to the course to provide the students with a variety of learning resources and to meet their varied learning styles. Some of the online tools included McGraw Hill Connect software (LearnSmart, APRevealed, assignments and quizzes) and last online. eScience provided students with an alternative lab experience that was similar to the on-ground and hybrid courses. Both online, hybrid and on-ground courses all met the course outcomes and requirements giving the students the same learning experience.

References


Figure 1: Sample eScience lab. This kit includes materials that are used in both Anatomy and Physiology 1 and 2 courses. Kits can be custom built to match the individual course objectives.

Figure 2: Examples of dissections performed by students at home. A. Blood pressure measurements. B. Broly's lab demonstration.

Figure 3: Examples of lab experiments performed by students at home. A. Acid-base lab. B. Blood typing lab. C. Msas and Frank's lab. E. Scatch laboratory.

Table 1: These grades represent averages from the Spring 2013 semester classes. Each AP1 and AP2 course was taught by the same instructor.

Table 2: These grades represent averages from the Spring 2013 semester classes. Each AP1 and AP2 course was taught by the same instructor.