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Engaging Allied-Health Students with Virtual Learning Environment Using Course Management System Tutorial Site †

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INTRODUCTION

Human Anatomy and Physiology (A&P) I and II are major gateway courses into many health related science careers. Students at Queensborough Community College come from various ethnic, cultural, and social backgrounds as well as with different levels of class preparedness. When they take A&P I as the first pre-requisite class, many of these students lack formal training in science and are overwhelmed by the depth and immensity of the material presented in the course. Although the enrollment for this class is heavy, these factors lead to high attrition. Yet one common feature of the new generation of students is their access to and familiarity with the Internet, digital technology, and other technological gadgets such as smart phones, tablets, etc. Today's students are more tech-savvy and these gadgets engage (or distract) them more than books (1). This indicates a clear need for technology-based alternatives to traditional methods to engage students in an urban community college setting. Internet-based strategies such as wikis, blogs, or course management systems can be used effectively to incorporate core science concepts and disciplinary competencies (2) in students. We developed a supplemental tutorial website to engage students and help them develop a general course knowledge base in order to improve their academic performance.

PROCEDURE

A tutorial website was set up in Blackboard (course management system developed by Blackboard, Inc.) and made available to students from over 20 class sections for a total of eight semesters. The Blackboard website contained a collection of diverse study resources on topics that were covered in the lecture and lab classes such as cell structure, enzyme chemistry, microscopy, histology, the human skeletal system, and the nervous system. The resources included chapter power points, quizzes, puzzles, animations for the animal cell structure, organelles and their functions, links to websites for topics such as identification of parts of the microscope or virtual microscopy, and virtual histology with images of tissue sections. Many of the resources used in the Blackboard site were links to websites outside of Blackboard domain, a list of which is provided in Figure 1 (Appendix 1). Each organ system discussed in class usually had one or two supporting exercises. While the initial designing phase was time consuming (12–15 hours), once the website was developed, maintaining it in subsequent semesters required little time. The website did not require students to learn any new material; only material discussed in lecture and laboratory sections was reviewed. The effectiveness of the tutorial website was assessed by comparing grades of students who used the tutorial with those who did not. Queensborough CC Institutional Review Board approved the usage of students' grades since no identifiers were used in the data analysis. We also surveyed students for feedback on the usage of supplemental online instruction.

RESULTS

During the period from fall 2008 to fall 2011, we analyzed over 500 students from approximately 10 different course sections for their academic performance on the first two practical exams. Approximately 40% of the students visited the website more than 20 times during the semester. Analysis of student grade scores for both practical exams indicated that students who used the website regularly scored higher than those who rarely used the website. To evaluate students' learning comprehension, we set up an anonymous SALG (Student Assessment of their Learning Gains) survey instrument and evaluated their learning gains for (1) understanding, (2) skills, (3) attitudes, (4) using activities at the website, (5) quizzes, and (6) the available resources. Overall, students reported positive learning gains in all six areas. Among the students who used the website, 67% of them said they understood the course materials better and 56% replied that they can comprehend course material and apply it to other topics better. We recently sampled four sections during the spring 2013 semester and surveyed a total of 101 students for feedback using another survey instrument, SurveyMonkey; the results are shown

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†Supplemental materials available at http://jmbe.asm.org

in Table 1 (Appendix 2). Briefly, more than 50% of the students surveyed concluded that the website helped them a lot to organize/comprehend the course materials and, more importantly, to integrate the course contents into their learning processes as well as to apply their knowledge to newer concepts.

We found that, in general, students who visited the website scored higher than students who did not although there were some students who never visited yet scored very high on the exams. Likewise, there were students who visited over 100 times, yet scored poorly. Since the time span of each visit and comprehension ability of these students was unknown, it can be understood that students visiting the website frequently without focusing or comprehending the material would not benefit from it. The fact that the students we analyzed had different instructors served as a built-in control because the difference between the two groups was found to be independent of the class instructor. Also we saw a high correlation between students who never visited the website and those who withdrew from the course. Out of 442 students we analyzed; 31% of them never visited the website and withdrew from the course whereas only 6% of the students who visited the website withdrew. This data may indicate that students who visit the website seek help and thus tend to stay in the course.

CONCLUSION

Supplemental online instruction, when made interactive, can be a powerful teaching tool to engage undergraduate community college students. Due to this positive outcome, similar Blackboard sites with supplemental instruction have been developed for other Biology courses such as Human Anatomy & Physiology II and General Microbiology, both of which are accessed and used heavily by students.

SUPPLEMENTAL MATERIALS

Appendix 1: List of websites and resources used in the Blackboard course management system site

Appendix 2: Table 1: SurveyMonkey results showing feedback of students who used the tutorial site

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