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Successful Integration of Asynchronous Collaborative Learning Into the Traditional Anatomy and Physiology Classroom

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ABSTRACT

In a pilot project completed during the fall 2001 semester, I used online collaboration as a way of integrating an environmental theme into the content of Human Anatomy and Physiology I (BIO 1007). Students did research on bioterrorism and anthrax infection, which culminated in a "fact sheet" about anthrax infection. Students met with their groups both during class and online and were required to post all assignments to their private group conferences. Groups were monitored throughout the semester to ensure 100% participation. Course and project-specific evaluations at the end of the semester suggested the project resulted in a more well-connected class, with the majority of students appreciating the benefits of using online discussions. The successful outcome of this project suggests the possibility of offering BIO 1007 as a reduced-seat time course, where some course content and objectives would be covered online in lieu of meeting face to face.

KEYWORDS

Asynchronous/online discussions, WebBoard, collaborative learning, reduced seat-time

INTRODUCTION

WebBoard is an online discussion thread that is password-protected and known for its ease of use. When used effectively, it can be a powerful addition to the traditional classroom. It can be used to build strong learning communities among students that will last throughout the academic year. Many science courses that have laboratory components are not suited for the online environment in their entirety. Human anatomy and physiology (AP) labs have a highly visual, hands-on approach to teaching that involves the use of cat dissection and laboratory experiments for much of the course content. The use of three-dimensional anatomical models and charts, cadavers, and cat dissection makes it difficult to imagine this part of the course being offered completely online. However, the lecture component of AP, which centers on classroom discussions related to physiology and homeostatic imbalances (diseases), makes this part of the course quite adaptable to an online collaborative discussion format.

BIO 1007 is the first semester of Human Anatomy and Physiology and meets one night per week for lecture and one night per week for lab. Because students only meet once per week for lecture, online discussions can be used to keep them engaged in course content outside of classroom, thus leading to increased exposure to the topics at hand. WebBoard has been used for this purpose for the past three

years, and in recent semesters I have focused my attention on using asynchronous collaborative projects to incorporate a case study approach that allows students to discover how anatomy and physiology relate to their everyday lives.

When used ineffectively, students in a traditional classroom may resent going online to complete certain course assignments and objectives. I intended to engage learners in discussions that would help build a sense of community among the class. My objectives included the following:

1. Engage students in online discussions that utilized various science web sites, allowing them to gather, collate and synthesize information as it applies to human anatomy and physiology
2. Improve students' ability to critically evaluate, analyze and synthesize science information
3. Integrate an environmental theme into the first semester Human Anatomy and Physiology course (BIO 1007), using bioterrorism and anthrax as a case study
4. Discover if using case studies increases student involvement with asynchronous collaborations and course concepts

METHOD

My original plan was to use environmental contaminants, such as lead and radium, to stimulate student interest and ability to apply course concepts to real-world examples. Following the terrorist attacks on the World Trade Center on 9/11/01, I felt a need and urgency to change my focus. In keeping with the environmental theme from the original plan, I used anthrax, a widely distributed microorganism found commonly in the soil, as the focus of online group projects for the fall semester. The contamination of the U.S. mail, which followed the 9/11 attacks, became a real-world case study of bioterrorism.

Students were divided into eight groups of 4-6 people and given a total of five assignments over the semester. Although groups were given some lecture time to hold group meetings, they were expected to use private group conferences to confer with each other. I was able to follow the private conferences, and it became a good way to ensure participation of all students. Rubrics were given in advance, outlining the grading criteria.

The group project was divided into five parts (Table 1). Assignment guidelines were posted on WebBoard. Assignment One was designed to familiarize students with WebBoard and the Internet. The culmination of the project included a final synthesis of information that would be in the form of a "Fact Sheet" about anthrax infection. Students were graded on each assignment as it was completed throughout the semester.

Table 1: Summary of the 5 Assignments for the Collaborative Learning Project

| | |
|--------------|--|
| Assignment 1 | Review criteria for evaluating informational Web sites using the following Web resource: http://www2.widener.edu/Wolfgram-Memorial-Library/webevaluation/webeval.htm |
| Assignment 2 | Visit Centers for Disease Control Web site at http://www.cdc.gov to find information regarding the epidemiology of anthrax infection |
| | |

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|--------------|--|
| Assignment 3 | Visit the International Policy Institute for Counter-Terrorism at http://www.ict.org.il/ and compare and contrast chemical and biological warfare. In addition, each group was to locate another Web resource on bioterrorism and state a different organism that the author is concerned other countries might use, and why they might use it. |
| Assignment 4 | Groups were to investigate the capabilities of other countries in terms of launching a biological attack on the United States, plausible methods for dispensing anthrax into the environment, how our country can best prepare for such an attack, and the group's opinion of whether a serious attack is likely, and why |
| Assignment 5 | Development of a Fact Sheet on Anthrax infection detailing the three forms, their epidemiology, sources cited, and where the public can get more information |

Each week students were reminded why group projects were a component of the course. The reasons included: providing students the opportunity to hone their skills at working with others; increased exposure to resources on the Internet and using technology effectively; improving their ability to think critically and evaluate science information; and enhancing their awareness of the politics of the world, which directly impact us all.

CHALLENGES AND ROADBLOCKS

BIO 1007 is demanding of students in terms of the extra time outside the classroom necessary for reading, synthesizing information, studying lab materials, and learning new vocabulary words. Because of these demands, it has been difficult to successfully incorporate online projects without getting negative feedback from students regarding the amount of extra time involved with the course, which was typically attributed to the online components of the course. Students have expressed in the past that the online work takes time away from studying the core course objectives. This is a valid criticism, which is why projects must be designed carefully and related to lecture content whenever possible. The most challenging aspect of this type of project involves convincing students of the basic value of the assignments, and how they relate to both the course objectives and institutional general education objectives. It is important to remind students throughout the project about the reasons (objectives) for assigning the online work. I posted my objectives in WebBoard and also included them in PowerPoint lectures each week. This seemed to help achieve student "buy-in," and reduced negative feelings about the assignments.

The most surprising aspect of the project was how well the more than thirty students worked together within their small groups. There were no unmanageable personality conflicts along the way, and everyone appeared to pull their weight throughout the semester.

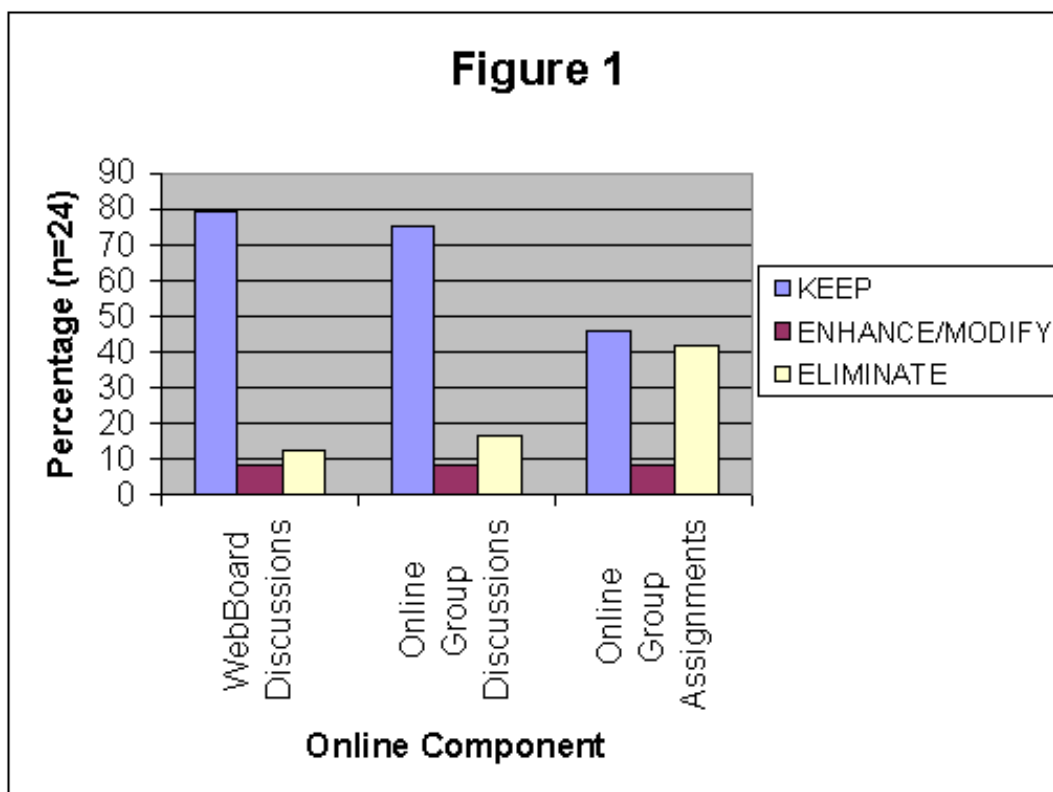
EVALUATION

All groups successfully completed the project. The eight Anthrax Fact Sheets were collated (each group contributed one section to the fact sheet) and posted on the course Web site (<http://www.ivcc.edu/caley>). At the end of the semester, students were given two evaluation instruments to express their opinions regarding the online collaborations.

The "Group Work Reality Check" included questions that allowed students to reflect both on their own participation in the project and how students perceived others' participation. One hundred percent of the students (n=24) felt they completed all their assigned tasks. One student admitted being late with one assignment. All but one student said they were really committed to the project and participated actively. All but one student agreed their team members were committed to the project. Eighty-three

percent of the students felt the use of private group conferences in WebBoard was an effective way of interacting with their group members. Twelve percent were not sure.

The second evaluation instrument was a student evaluation of resources available on the course Web site. Students were to check one of three responses: 1) Keep, 2) Eliminate, or 3) Enhance/Modify with reference to the online components of the course (Figure 1). Of the 24 students who completed the survey, 79% selected Keep WebBoard discussions, 8% Enhance/Modify, and 12.5% Eliminate. Seventy-five percent chose Keep online group discussions, 8% Enhance/Modify, and 17% Eliminate. Forty-six percent selected Keep online group assignments, 8% Enhance/Modify, and 42% Eliminate.



These results suggest that the majority of students felt the online component of BIO 1007 was a useful feature of the course. Even though only 46% selected “Keep online group assignments,” this was not surprising. Students are often uncomfortable working with others to complete assignments, particularly when some students do not pull their own weight.

It was my intention that each of the five WebBoard assignments would be brief, so students could focus on all assignments equally. Two students (8%) indicated on an evaluation they felt the assignments were too long and involved, which I consider a very low percentage. One possible explanation to account for this positive result may be that by reminding students each week about the objectives of the group assignments, students were convinced of the value of their collaborative efforts. Also, following the events of 9/11, it was not difficult for students to relate world political events and the very real threat of bioterrorism to their own lives. It was most ironic that IVCC faculty had chosen an environmental theme for that academic year, as the subject of bioterrorism in general fits into the discussion of this broader theme.

I feel the objectives of the pilot project were successfully met. Students were engaged in online collaborations that required the use of a variety of science informational Web sites. They effectively gathered, collated and synthesized information that led to the formation of their own conclusions regarding the events of 9/11. Students became more critical of the sources of information they found on the Internet. The collaborative learners formed a cohesiveness that led them as a group to more effective classroom participation and behaviors characteristic of successful students.

The students' responses regarding using WebBoard for collaborating and submitting assignments exceeded my expectations. I was impressed with how hard the students worked on the assignments throughout the semester and the teamwork that was displayed within most groups. I saw a strong community of learners building on their knowledge by utilizing the vast resources available to them on the Internet. It seemed as though the students who struggled with the "regular" course content in anatomy and physiology appreciated the assignments as a way to help improve their overall course grade. Other students felt that the assignments included too much work, and that this took away from their study time.

Anatomy and physiology students, who are typically allied health professions majors, know they will need to understand the basic principles learned in anatomy for future courses. This makes the average anatomy student very focused and goal-specific. It is always a challenge to get them to accept the idea of doing extra assignments or work outside of the classroom. It is also a challenge to get night students to actively take part in the learning process. They often prefer to sit back and let the lecture instructor take charge. Passive learning has been the historical model that students still come to expect in the classroom.

The asynchronous discussions were used effectively, based on a response rate of 79% of students who indicated I should keep general WebBoard discussions in BIO 1007. I found it very interesting, although not surprising, that 75% wanted to keep the online **group discussions**, but only 46% voted to keep the online **group assignments**. Students are often uncomfortable when problems arise within a group and have difficulty dealing with conflict. I reminded students that although poor group dynamics might make them uncomfortable, this was a valuable learning experience that would give them the tools necessary to solve problems in the work place. I will continue to strive for increased acceptance of online collaborations in BIO 1007.

SUMMARY AND RECOMMENDATIONS

In summary, the use of online collaborative learning can be successful in the rigorous anatomy and physiology classroom. Careful planning and outlining of objectives prior to the start of the semester, and continual reminders given to the students regarding these objectives, were key components to the success of this project. Carefully outlined objectives are also an important part of evaluating whether you have achieved your goals as an instructor.

In future implementations, I will streamline the assignments to make them less demanding in terms of the time commitment demanded from the students. Instead of using a broad theme, such as bioterrorism, I will work to develop short case studies that directly tie form (anatomy) with function (physiology) by using human diseases that require Internet research.

I am continually adjusting the online components of the course in an attempt to find a balance between covering subject-specific objectives and also covering the general education goals set forth by our institution. The use of the student evaluation instruments was imperative in order for me to objectively review the success of the online collaborations. Without them, I could have easily concluded that many students did not appreciate the benefits of using asynchronous discussions in class, when in fact the vast majority of them did. Although I feel Human Anatomy and Physiology is not suitable as an online course in its entirety at this time, these data suggest offering a portion of BIO 1007 for reduced seat-time would be a successful venture in future semesters.

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BIOGRAPHICAL STATEMENT

Susan Caley Opsal holds a Masters degree in Biology from the University of Wisconsin–Eau Claire and has been an Anatomy and Physiology Instructor at Illinois Valley Community College since 1995. Early in her career she began using the Internet for instruction and has developed a wide array of online resources for her students over the years that includes lecture outlines, online quizzes, lab images, and lecture prep questions. During the last three years she has been maximizing the effectiveness of asynchronous communications using WebBoard in her two-semester sequence of Anatomy and Physiology, which meets at night. Sue has also been involved with faculty technology training and has assisted many IVCC faculty members in developing their own web pages for instruction. She has presented her work in instructional technology both at the regional and national level, which includes presentations at the 1999 *ION Faculty Summer Institute* and the 1999 *League for Innovation in the Community College* technology conference in Chicago.

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