Pros and cons of a group webpage design project in a freshman anatomy and physiology course

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Crisp KM, Jensen M, Moore R. Pros and cons of a group webpage design project in a freshman anatomy and physiology course. Adv Physiol Educ 31: 343–346, 2007; doi:10.1152/advan.00120.2006.—To generate motivation and promote the development of written communication skills, students in a freshman-level anatomy and physiology course for nonmajors created group webpages describing historically important diseases. After the groups had been formed, each individual was assigned specific components of the disease (e.g., causes or treatments), which were subsequently combined into a final product. Interviews and questionnaires were used to document students’ previous educational experiences regarding, and attitudes toward, the project. Students learned more about website design than about anatomy and physiology, but students preferred the assignment over traditional term papers. Although most students could find relevant information for this project on the internet, they were uncritical in judging the accuracy of the information they found.

BACKGROUND AND METHODS

Until 2004, the General College was the developmental education unit within the University of Minnesota, which has now been absorbed into the College of Education and Human Development. The goal of the General College was to improve students’ academic skills to a level where students could transfer and succeed within other colleges in the university system. The student population of the General College was both ethnically and socioeconomically diverse; almost 30% were students of color, and most came from inner city public schools. Additionally, many were relatively new to the United States, have been enrolled in Commanding English programs (9), and entered the University system. The student population of the General College was both ethnically and socioeconomically diverse; almost 30% were students of color, and most came from inner city public schools. Additionally, many were relatively new to the United States, have been enrolled in Commanding English programs (9), and were unfamiliar with computers and the internet. Because the General College focused on developmental education, helping students develop academic skills (e.g., reading, test taking, and computer skills) was emphasized in addition to traditional curricular goals (e.g., learning the concepts of anatomy and physiology). For further information regarding teaching anatomy and physiology in the context of developmental education, see Jensen and Rush (7).

The Human Anatomy and Physiology course is a freshman level, four-credit semester course that involves 2 h of lecture, 2 h of dissection laboratory, and 1 h of computer laboratory each week. The lecture and laboratory components of the course use traditional curriculum and instructional methods. The computer laboratory is where novel assignments, such as computer projects and cooperative quizzes, are implemented. According to the University of Minnesota Institutional Review Board-approved protocol obtained, students in this study were those who enrolled in GC 1135, signed a consent form, and participated in group interview sessions.

Description of the webpage project. Two instructional goals in the computer laboratory are cooperative learning and familiarity with technology; although not typical goals for anatomy and physiology courses, they are a good fit within a developmental education science course. The disease webpage project was developed over several years to help achieve these goals. Prior to the webpage project, students were placed randomly into groups of three to five students and assigned to complete a short introductory exercise that involved the construction of a webpage that included interests and information about individual group members. The intent of this first exercise was to both introduce group members to each other and to teach basic webpage construction skills (5). Students were taught the basic steps required to build a webpage using Netscape Communicator 4.0 (Netscape Communication, Mountain View, CA), e.g., inserting images, creating links, and using the tools found within an internet browser.

The disease webpage project involved both individual and group work. Each group was assigned a specific disease of historic significance (e.g., smallpox), and each student was assigned a specific aspect of the disease. For example, one student created a page about the symptoms of smallpox, another student created a page concerning the treatments currently available for smallpox, etc. Each individual webpage was required to contain at least one picture (accompanied by a proper reference), one link to an external webpage, appropriate references, five facts that were germane to their aspect, and a three-question quiz pertaining to information on their page.

After 3 wk of working on the individual aspects during laboratory meeting times, groups had to combine their individual pages into a single larger project. Because of negative past experiences with groups submitting completed projects on time, we had students submit copies of the individual components prior to combining them into the group project. The goal here was to ensure that each individual had completed their portion of the projects. [Individual accountability is a key feature of group learning (8).] Groups were given 1 additional week to combine the individual components into a functional webpage. The final project was graded in reference to the requirements (e.g., accuracy and relevance of the content, missing links or links that did not function, presence of the 3-question quiz, etc.), and a grade was returned to the students 1 wk later.

Data collection mechanisms. After completing the web projects, students were offered nominal bonus points for participating in a
group interview. Ninety-six students were interviewed. Interviews began with students writing their names on a piece of paper and then writing answers to the following questions: “What was the specific topic of your personal webpage?” and “List 1 or 2 facts about your topic.” Students were then interviewed orally for ~10 min in an informal group discussion. At the end of the oral interviews, students were asked to write down something good and something bad about their group.

The interviews were semi-structured in that they started with the same set of leading questions, but most conversations drifted to different topics after a few minutes. Table 1 includes the most common questions asked by the interviewer. Student interviews were tape recorded by consent of the students; no students objected to being taped. Data from the interviews were analyzed in the following ways. First, students’ verbal comments from the interviews were collected and categorized by topic. To examine trends across multiple interviews, the numbers of interviews in which students discussed a particular issue were counted. This allowed for the quantification of interview data, as shown in Table 1, despite the fact that not all students contributed during oral interviews, nor did students who spoke volunteer the same amount of information. These responses were also categorized, and common responses were determined by the percentage of students who responded in a particular way. The primary goal of the interview data was to sense trends in students’ opinions about the assignment.

**RESULTS**

A total of 122 students constructed websites, and 96 students participated in the subsequent interviews. Sixteen group interviews were conducted with an average of six students in each session. Most students completed the project in the computer laboratory with the help of the instructor and a teaching assistant. Some students worked in their dormitory rooms or computer laboratories after hours; however, many students did not have adequate computer skills to complete the project outside of class time. A few of the better webpage projects were posted on the course website (http://msjensen.education.unm.edu/1135/Cool/) with the consent of students to serve as examples for the next semester’s students and as a reward for creating a first-rate product.

*Results from the group interviews.* Group interviews are summarized in Table 1. All interview sessions began with a question about whether the students would prefer to do a webpage project or write a term paper. Sixty-nine percent of the responses to this question reported favoring the creation of webpage projects over writing term papers. Reasons for this preference were many but generally focused on the project being fun, novel, and interesting. Students said that the project was more interesting than a term paper because it incorporated pictures, quizzes, and diverse types of information not normally found in a term paper and described it using terms such as “creative,” “easy,” “colorful,” “animated,” “artistic,” “interactive,” “unique,” “a change of pace,” “kept you doing something,” and “you can put your personality in it.” Other students, particularly those for whom English was not a first language, suggested that it was easier to express your ideas with a webpage because there were “too many rules” governing the writing of term papers, such as writing in sentences, grammatical rules, and word or page lengths. Students also reported that webpages change the way that you see, manipulate, and convey information, using pictures and “showing” information without the constraints of word lengths and other rules governing term papers. Some students suggested that less revision and more “fluff” and “blabbering” went into the writing of term papers, although others suggested that the same thing can happen in writing a webpage.

When students who said the webpage project was preferable to a term paper were asked why, 73% said that the visual nature of the web page was advantageous. “We’re visual learners,” one student said. “We have TV, movies, MTV... if something pops up on a screen, we can get it.” He described information on webpages as being “right there” and said “we can control it,” referring to the navigational aspects of hypertext. Another student said that he “would have learned more from a term paper,” but that he “learned better” from the webpage project because it was more “visual.” Sixty-four percent responded that they preferred the webpage project because building a webpage forced them to revise and rewrite their pages a number of times and that they learned from going over the key points repeatedly. In contrast, one student said that writing term papers consisted largely of “regurgitating into a term paper and never looking at it again.” Forty-five percent added that they did not like to write term papers.

*Technology as a barrier to learning.* When students were asked if they felt that learning how to make webpages interfered with learning the biology, 63% responded in the affirmative. Of these interview sessions, 60% cited a lack of technical skills in their groups as a major problem, and 40% said that the technology was frustrating. Thirty-one percent volunteered that there was not enough time to learn both the technical skills and complete the assignment. One student said that in building a webpage, he could see himself getting so carried away with trying to “make the web page look snappy” that he would not allow himself sufficient time to add substan-

<table>
<thead>
<tr>
<th>Question Posed</th>
<th>n</th>
<th>Most Common Responses</th>
<th>Response Frequency, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Was the webpage project preferable to writing papers?</td>
<td>96</td>
<td>Yes</td>
<td>69</td>
</tr>
<tr>
<td>Why was it preferable?</td>
<td>62</td>
<td>More visual</td>
<td>73</td>
</tr>
<tr>
<td>Would you learn more from this project or from writing a term paper?</td>
<td>96</td>
<td>Webpage project</td>
<td>50</td>
</tr>
<tr>
<td>Was learning how to make webpages a useful skill for you to learn?</td>
<td>96</td>
<td>Yes</td>
<td>75</td>
</tr>
<tr>
<td>Did learning how to use the technology interfere with learning the biology?</td>
<td>56</td>
<td>Yes</td>
<td>60</td>
</tr>
<tr>
<td>Did you like the teamwork aspect of the project?</td>
<td>96</td>
<td>Yes</td>
<td>50</td>
</tr>
<tr>
<td>Was it difficult to find the information you needed on the world wide web?</td>
<td>96</td>
<td>No</td>
<td>100</td>
</tr>
</tbody>
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n, Numbers of respondents. There were 96 respondents total in 16 group interview sessions.
Collaboration between group members. Fifty percent of the interview groups said that teamwork was a positive aspect of this project. “It’s all about learning to work with other people,” one student observed. Although students were instructed to combine their pages with those of their group members, one student commented said, “I never saw what my group member’s pages looked like.” Apparently, many students did not look at or learn from their fellow group members’ pages because of either time constraints or lack of interest.

Written responses to interview questions. When asked to list one or two facts about their disease that they learned from the webpage assignment, 31% of the students listed one fact, 61% listed two facts, and 8% listed three facts. A total of 170 facts were listed by the students. A biology graduate student analyzed the facts for accuracy. Despite having to list only one or two facts, only 76% of the facts listed were correct or relevant to the particular disease the student who listed the fact was studying.

A few correct facts included the following: “Encephalitis can be gotten from mosquitoes,” “Haven’t had an outbreak of smallpox in 30+ years,” and “There are three types of acid maltose deficiency (infantile, juvenile, and adult).” Examples of incorrect responses include the following: “Humans don’t get HIV through blood transfusions” and “Tuberculosis can be caused by smoking.”

When asked to write down one thing they liked about their group, 56% of the students responded that their groups worked well together, and 17% said helping each other was a positive aspect of the assignment. Only 5 of 96 students had nothing positive to say about their group experience. When asked to describe one thing they disliked about their group, 25% of the students had no complaint, 24% of the students cited unequal participation among group members, and 16% of the students referred to problems of group member attendance and punctuality. The remainder of students reported complaints such as disagreements between group members, problems with communication, not enough time to complete the project, and a lack or disparity of technical expertise.

DISCUSSION

College students endure difficult course assignments with the stubborn belief that their hard work will ultimately pay off with a rewarding career, i.e., that the skills they acquire in college will benefit them in their quests for future employment. The National Research Council, The Boyer Commission, and many other national organizations publish reports to help educators shape their curricula so as to strengthen the correlation between academic experiences and marketable job skills. For example, Handel (3) reports that 47% of current United States workers use software applications for their specific line of work, thus emphasizing the important of computer literacy. However, the need to move beyond mere literacy is clearly documented by Elliot (2), who projected that 60% of today’s jobs will be replaced by computers by the year 2030. To help prepare students for a future that requires now-unknown job skills, many policy documents, such as the Boyer Commis-

Downloaded from http://advances.physiology.org/ by 10.220.33.6 on June 26, 2017
can make a webpage means that web-based facts lacks accountability, thus leading to misinformation ranging from unintentional to deliberate, e.g., the concealment of commercial conflicts of interest (10). As our society moves to increased dependence on the internet for all forms of information, lessons stressing the importance of validity and reliability of information may be one of the most important outcomes for a freshman-level, nonmajor, science course.

In the first few years the webpage project was implemented, students encountered many difficulties and frequently struggled to complete the project. Despite the difficulties, students were excited to learn the technology skills and proud of their final products. In the past few years, however, students’ computer skills have improved to a point where this assignment was no longer stimulating; in fact, the webpage assignment became “just another assignment.” The instructors and teaching assistants spent far less time helping students in the computer laboratory and noticed that a large number of students left the laboratory early and completed it elsewhere without interacting with their group members.

Two of the goals of this project were to provide students with an assignment that would promote student-student interactions and would also be enjoyable, especially for students who had little interest in anatomy and physiology. After much thought and consultation with teaching assistants and students, the group webpage assignment was dropped and replaced with a tradebook reading assignment (4). A webpage research project is still a valid and realistic assignment, but its use as a motivational tool has greatly diminished as computers and the internet have become more commonplace within both academia and all of society.

REFERENCES