

# Some Observations on Student Use of Electronic Communications in Second-Year Biology Courses

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**Abstract:** This paper considers the student use of electronic communications in two second-year university Biology courses. Over a three-year period, student contributions to a Web-based discussion forum, an e-mail list serve, and e-mail directly to the instructor, were recorded. A number of characteristics of these electronic communications such as the number of student users, time of day used, types of use, and differences in student performance between the on-campus lecture, distance education correspondence, and Web-based versions of these courses will be discussed.

## Introduction

While computers, by themselves, have not yet revolutionized education any more than previous educational technologies such as the motion picture, educational radio, teaching machines, and television, they have become useful tools, which are beginning to change the face of education. One area which has seen such change is Computer-Mediated Communication (CMC). The types of CMC analyzed in this paper are e-mail and Web-based discussion forums.

## The Courses

Biology 2040 (Human Biology) and 2041 (Environmental Science) are second-year, non-major, non-laboratory courses which are regularly offered in on-campus lecture and off-campus correspondence formats. Biology 2040 is also available as a Web-based course.

## Characteristics of CMC Use in the Courses

An analysis of the time of day students used CMC showed that there was some use of CMC throughout the 24-hour period (divided into 4 hour time blocks), and in fact over 45% occurred at times outside of regular classroom hours. These findings seem to support Cavalier's (1992) contention that CMC allows students to participate in 'round-the-clock' dialogues.

The levels of use of CMC in the different formats of the two courses varied considerably. While the percentage of students using CMC in the Web-based format of 2040 was much higher (61%) than for any other format (8.9-23.1%), it is interesting to note that almost 40% of the students in the Web section made no use of CMC. An earlier study (Collins 2000b) tends to suggest that students who are frequent users of CMC tend to achieve

higher final course scores than infrequent users. While use of CMC in the on-campus formats was predictably lower (23.1% in 2040; 17.3% in 2041) than for the Web-based format, CMC in the off-campus correspondence classes was even lower (8.9% in 2040; 11.7% in 2041). This is surprising given the fact that distance education students' main method of communication with the instructor is by e-mail, while on-campus students have access to the instructor both in the classroom and in his office.

The main use of e-mail in all three instructional formats is for questions relating to test and exams. The second most common use for both correspondence and Web-based formats is for administrative purposes (i.e. scheduling meetings etc.). In the on-campus sections the second most frequent use is for questions relating to assignments, but this is merely a reflection of the fact that assignments are more often used in these sections. It is interesting to note that in an earlier study (Collins 1998) the percentage of e-mails about administrative and other matters amounted to only 2% but has grown to 20% in the present study.

In an earlier study (Collins 1998) there were also differences in the types of use related to student postings in the discussion forums. In the 1994 2040 class, content-related items accounted for 45% of postings, while class discussions accounted for only about 20%. In 1995 these percentages had changed dramatically, with the content-related items only accounting for 8% of postings, while class discussion accounted for almost 70%. During the period of this present study content-related items, class discussions, and assignment-related queries accounted for 70% of the postings in the on-campus classes. In the same period in the Web-based 2040 classes, however, items relating to tests and exams accounted for over one-third of the postings, with content-related items making up 18% of postings, and student discussions accounting for only 15%.

## Student Performance

The results of an analysis of final course scores indicate that students in the Web-based sections generally perform at a lower level (mean = 71.4) than those in the traditional classroom format (mean = 76.9), and these in turn perform at a lower level than students in the correspondence sections (mean = 78.5). The findings from this study then are in marked contrast to other similar studies (Navarro and Shoemaker 1999; Wideman and Owston 1999) which found that students in Web-based courses did better than those in both on-campus and correspondence courses. Several explanations have been advanced for the differences (Collins 2000a).

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