

Online Writing as a Form of Electronic Communication in a Second Year Biology Course

Michael K. Barbour
mbarbour@coe.uga.coe

University of Georgia at Athens
Athens, Georgia, 30602, United States

Michael A.J. Collins
collinsm@mun.ca

Memorial University of Newfoundland
St. John's, Newfoundland, A1B 3X9, Canada

Abstract - This paper considers student use of an online discussion forum in a second year Biology course and how that participation may be an indicator of increased student success in the course. The authors discuss how participation in the online discussion forum is a form of public writing in which the students need to have an understanding of the topic about which they are writing. It is this practice of writing with a clear understanding that may increase students' success in the course and not simply the use of online communications.

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 or electronic messaging.

According to Zack (1995), the term electronic messaging includes "several modes of computer-mediated communications, including electronic mail, electronic talk or chat, computer conferences or bulletin boards, and electronic document exchange." (p. 206) This definition is very broad in its scope and for the purpose of this study, electronic messaging will be limited to electronic mail, messages sent to an electronic listserver, and posts to a web-based discussion forum.

Literature Review

This particular study was developed from three earlier studies conducted by Collins in 1995, 1996 and 1997. In the 1995 study, Collins (1995) found that the electronic bulletin board had fostered "student-student interaction and student-professor interaction... of course student-professor interactions through computer conferencing will never be a total replacement for face to face interactions, but computer conferencing does provide another channel for such communication." (p. 189) He also stated that "the student responses [from a student questionnaire] seem to suggest that even students who would normally be reluctant to ask questions in class or comment on issues will do so through computer conferencing." (p. 189) This observation is similar to Schwalm's assertion that even formerly silent students can become addicted to communication when the latter is electronic. (in Schoenfeld, 1991, p. 1)

As a 1996 follow-up to that initial study, Collins (1998) again found the electronic bulletin board had fostered both student-student interaction and student-professor interaction. Collins speculated that this may indicate "that becoming more actively involved in a peripheral activity such as discussion leads to becoming more involved with the course as a whole and,

therefore, to better student learning." (p. 86) Collins and Barbour (2001) found that there appeared to be a relationship between letter grade and level of web forum use.

Only 'A's were very frequent users, and only 'A's and 'B's were frequent users. Only about one third of 'C's, 'D's and 'F's were infrequent users while two-thirds made no use of web forum. Students achieving an 'A' in the course were much more likely to be web forum users (21 of 42) than 'B's (12 of 29), who, in turn were more likely to be users than 'C's, 'D's, and 'F's (only 7 of 20). (p. 7)

This finding may be explained by Chickering and Gamson (1987), who put forward the concept that interaction is a key mechanism in enhancing learning. This concept could be applied to this study if one were to include electronic messaging as a form of interaction. In addition, Moore (1993), has shown the connection between writing in Biology and higher course scores as others have demonstrated for other subject areas.

However, this has raised the question is interaction or the act of writing enough to account for this enhanced learning or should that interaction be meaningful based upon the content area. This question forms the basis of this research paper.

Student Achievement and Electronic Messaging Usage

In using three web-based versions of Biology 2040 Modern Biology and Human Society I (Human Biology) from the 1997 academic year, Barbour and Collins (2003) presented the following table.

Table 1 - Frequency of use of the web forum and final letter grade from 1997 academic year

Level of use	Course grade				
	A	B	C	D	F
Very frequent	2	0	0	0	0
Frequent	1	2	0	0	0
Infrequent	18	10	4	1	2
None	21	17	7	2	4
Totals	42	29	11	3	6

It was this table that Barbour and Collins utilized to determine the pattern that "Only 'A's were very frequent users, and only 'A's and 'B's were frequent users... However, when the two web-based semesters from 1999 are added to this table, the pattern becomes less noticeable.

Table 2 - Frequency of use of the web forum and final letter grade from 1997 and 1999 academic years

Level of use	Course grade				
	A	B	C	D	F
Very frequent	5	2	2	0	0
Frequent	4	3	2	0	1
Infrequent	26	13	8	2	2
None	34	28	11	3	7
Totals	79	46	23	5	10

As the sample size has started to grow, the pattern has disappeared. A possible explanation for this is that by 1999 more students have become more comfortable in using the web-based forum, not only those who had a stronger knowledge of the subject area.

However, this still does not address the question of is interaction or the act of writing enough to account for this enhanced learning or should that interaction be meaningful based upon the content area. In order to answer this question, Barbour and Collins utilized the following scale.

- 0 – No content basis
- 1 – Administrative
- 2 – Content-based question or message
- 3 – Content-based question or message with brief explanation
- 4 – Content-based question or message with substantial, but incomplete explanation
- 5 – Content-based question or message with complete or near complete explanation.

It was determined that only the Spring 1999 semester of Biology 2040 had a large enough sample of messages for this scale to be utilized effectively. Each message was assigned a value based on the above scale. Table 3 indicates the range of message upon that scale.

Table 3 – Range of scale for Spring 1999 web forum messages

	Scale					
	0	1	2	3	4	5
Number of messages	2	41	19	12	4	1

Based upon the table above, the majority of the messages in the web forum were of an administrative nature, such as questions about the timing or format of assignments or exams. However, forty-six percent of the messages did have some content-basis.

When the scale value for each message is averaged on a student by student basis, the following table is produced.

Table 4 - Value of use of the web forum and final letter grade from Spring 1999

Value of use	Course grade				
	A	B	C	D	F
2.01 - 2.5	1	0	0	0	0
1.51 - 2.0	3	2	1	0	0
1.01 – 1.5	1	0	1	1	0
0.51 – 1.0	2	1	2	0	0
0 – 0.5	0	0	0	0	0
Didn't use web forum	1	3	0	0	3
Totals	8	6	4	1	3

This table illustrates a similar pattern to the one that was presented in Barbour and Collins (2003). The only student who had an average message value of higher than 2.0 scored an “A” in the course. The majority (5 out of 6) of students who had average message values of 1.51 to 2.0 scored an “A” or a “B”. The only students who scored an “F” in the course did not use the web forum at all.

Conclusion

Earlier findings have indicated that there existed a positive, but not conclusive, relationship between the number of times students posted to the web forum and the grade that the

student received. This study has found similar results, not solely based upon simply interaction, but on meaningful, content-based interaction.

These findings support the concept that contributing to a web forum is a carefully planned, deliberate writing activity on the part of the student and it is this interaction and public writing that are key mechanisms in enhancing learning.

However, Althaus (1996) speculated that higher levels of motivation or scholastic achievement may also lead some students to participate in electronic messaging more than others. (p. 14) This caution presents further questions for consideration in future research.

Selected Bibliography

Althaus, S. (1996). Computer-Mediated Communication in the University Classroom: An Experiment with On-Line Discussions. *Annual Meeting of the American Political Science Association*, San Francisco, California.

Cavalier, R. (1992). Course Processing and the Electronic AGORA: Redesigning the classroom. EDUCOM Review, 27 (2), 32-37.

Chickering, A. & Gamson, Z. (1987). Seven Principles for Good Practice in Undergraduate Education. American Association Higher Education Bulletin, March, 3-7.

Barbour, M. & Collins, M. (2003). Online Writing as a Form of Electronic Communication in a Second Year Biology Course. Media and Technology for Human Resource Development: Journal of Educational Technology, 14 (1-2).

Collins, M. (1995). Using Electronic Bulletin Boards with College Biology Classes. The American Biology Teacher, 57 (5), 188-189.

Collins, M. (1998). The Use of Email and Electronic Bulletin Boards in College-Level Biology. Journal of Computers in Mathematics and Science Teaching, 17 (1), 75-94.

Collins, M. & Barbour, M. (2001). Some Characteristics of Student use of Electronic Communications in Second-Year Science Classes. *International Conference for the Electronic Business, Science, and Education on the Internet*, Scuola Superiore G. Reiss Romoli, L'Aquila, Italy. (CD-ROM).

Moore, R. (1993). Does Writing About Science Improve Learning About Science? Journal of College Science Teaching, XXII (4), 212-217.

Schoenfeld, C. (1993). Electronic Forum Vivifies the Classroom. Academic Leader, 9 (11), 1.

Zack, M. (1995). Using Electronic Messaging to Improve the Quality of Instruction. Journal of Education for Business, 70 (4), 202-206.