

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

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The Study

- This research has been conducted in three phases and is about to enter the fourth stage.
 1. Research from 1993 to 1996 into the time of day that messages were posted and a content analysis of those message.
 2. Research from 1997- 1999 a continuation of the phase one research along with the period in the term when students made use of electronic messaging. The additional element of different deliver formats was also added in this phase.
 3. Research from 2000 to the present on the student performance in different delivery formats and the effects of electronic messaging on student performance.

The Study

- electronic messaging includes e-mail, messages sent to an listserver, and posts to a web-based discussion forum
- two different courses were considered
 1. Bio2040 - Modern Biology & Human Society I (Human Biology)
 2. Bio2041 - Modern Biology & Human Society II (Environmental Science)
- which were offered in on-campus lecture, off-campus correspondence and web-based delivery formats a total of twenty-two times over a three year (nine semester) period

Performance by Usage

- Slovacek (1989) found that there was a positive correlation between students' use of e-mail and final course grades (pp. 113-114)

Performance by Usage

Course	Format	Mean Final Score	
		Users	Non-Users
2040	Lecture	77.27% (n=130)	76.25% (n=461)
2040	Correspondence	73.98% (n=59)	75.88% (n=602)
2040	Web	73.84% (n=56)	73.73% (n=59)
2040	Overall	75.69%	75.92%

Phase II to III

Collins (2000b), found that in the web-based version of Biology 2040 during the Spring 1996 semester, there seemed “to be a relationship between the level of the web forum use and final course scores.”

Phase II to III

Semester	2040 OC	2040 Cor	2040 Web	2041 OC	2041 Cor
W97	20%	5%	67%		
S97		5%	20%		
F97	20%	17%	25%		
W98				13%	15%
S98		10%			8%
F98	23%				9%
W99		5%	63%	21%	
S99		10%	88%		8%
F99	28%				17%

Performance by Usage

E-mail

Level of Use	A	B	C	D	F
Very frequent	1	0	0	0	0
Frequent	1	1	0	0	0
Infrequent	19	20	3	1	4
None	21	8	8	2	2
Total	42	29	11	3	6

Performance by Usage

Web Forum

Level of Use	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
Total	42	29	11	3	6

Performance by Usage - Findings

- Only 'A's were very frequent users
- Only 'A's and 'B's were frequent users
- 'C's, 'D's and 'F's were either infrequent users or non-users
- 'A's were more likely to be users (21 of 42) than 'B's (12 of 29), who in turn were more likely to be users than those attaining lower letter grades (7 of 20)

Research on Writing and Performance

- Ambron (1987) found that most students mentioned the value of writing in helping them understand the subject (p. 266)
- Moore (1993) has shown the connection between writing in Biology and higher course scores as others have demonstrated for other subject areas (p. 217)

Research on Writing and Performance

- Chickering and Gamson (1987) believed that interaction is a key mechanism in enhancing learning (pp. 3-7)
- Piirto (1998) found the level of care that university students place into their composing of an electronic mail message was very low (p. 28)

Quality of Interaction

Semester	2040 OC	2040 Cor	2040 Web	2041 OC	2041 Cor
W97	20%	5%	67%		
S97		5%	20%		
F97	20%	17%	25%		
W98				13%	15%
S98		10%			8%
F98	23%				9%
W99		5%	63%	21%	
S99		10%	88%		8%
F99	28%				17%

Quality of Interaction

- Model to assess quality of the content in e-mail messages and posts/contributions to web-based discussion forums

- 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.

- Spring 1999 semester of Biology 2040

Quality of Interaction

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

Quality of Interaction - Findings

- Only 'A's were the highest value (2.01-2.50) users
- Only 'A's, 'B's and 'C's were moderately high value (1.51-2.00) users
- 'A's and 'B's were more likely to be higher value users

Chicken & Egg

- 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)

Chicken & Egg

Use	n	Mean Adjusted Score
None	8	-1.99
Low	7	+0.10
Medium	4	+8.25
High	5	+15.4

Chicken & Egg - Microthemes

- In a separate study, Collins found that students who did frequent and purposeful writings in Biology achieved higher course grades.
- This raised the intriguing possibility that web forum postings could be considered as pieces of writing, therefore contributing to higher achievement.

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, CA.
- Ambron, J. (1987) Writing to Improve Learning in Biology. *Journal of College Science Teaching*, XVI (4), 263-266.
- Chickering, A. & Gamson, Z. (1987). Seven Principles for Good Practice in Undergraduate Education. *American Association Higher Education Bulletin*, March, 3-7.
- Moore, R. (1993) Does Writing About Science Improve Learning About Science? *Journal of College Science Teaching*, XXII (4), 212-217.
- Piirto, J. (1998) University Student Attitudes Towards E-Mail as Opposed to Written Documents. *Computers in the Schools*, 14 (3/4), 25-32.
- Slovacek, S. (1989) Electronic Mail Use and Grades. *Western Education Computer Conference*, San Francisco, CA.

Other Studies

- Barbour, M. & Collins, M. (2004) The Effects of Online Writing in Student Performance in a Second Year Biology Course. *ACE-Online*.
- 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*, 14 (1-2), 33-42.
- Barbour, M. & Collins, M. (2002b) Electronic Messaging and Student Achievement in Second-Year Science Classes. *The Morning Watch* 30 (1-2). Retrieved March 17, 2004, from <http://www.mun.ca/educ/faculty/mwatch/fall02/BarbourCollins.htm>
- Collins, M. (2000a). Comparing Web, Correspondence and Lecture Versions of a Second-Year Non-Major Biology Course. *British Journal of Educational Technology*, 31 (1), 21-27.
- 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. (1995). Using Electronic Bulletin Boards with College Biology Classes. *The American Biology Teacher*, 57 (5), 188-189.