

Blogging in a Biostatistics and Research Design Graduate Dental Course: For Learning or Interaction?

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Abstract: The use of the Internet in health professions education has markedly increased in recent years. There is a need to understand the methods used by students to benefit from Internet-based teaching methods, especially those initially designed to promote social interaction such as blogs. This study describes how students used a blog in a biostatistics and research design graduate dental course. The aims of the blog were to offer exercises to train students for the exam and to enhance interaction among students and between students and instructor. Some features of the blog were modified to suit the course. Posts and comments were counted and classified by type, and their time statistics were analyzed. Students filled out a questionnaire to indicate whether and how exactly they used the blog or reasons for not using it. The relation between final exam scores and different methods of using the blog was assessed. Most of the posts were by the instructor offering exercises and model answers, whereas most of the comments were by students answering the exercises. Students were significantly more satisfied with blog uses related to interaction than with uses related to exercises (9.15 ± 1.19 , 8.73 ± 1.34 , $P=0.001$). The most frequently cited reason for not using the blog was lack of time. The most frequently reported method of using the blog was reading exercises and answers without actively contributing to the blog. Methods of using the blog significantly associated with higher scores in the final exam were actively contributing to the blog by posts or comments and interacting with colleagues. The main advantage of using the blog was promoting interaction between students and instructor, which is essential for the success of online learning in particular and adult learning in general.

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There is a growing trend to use e-learning in dental education.¹ However, the characteristics of today's adult learner have changed and necessitate a change in the type of technology used in e-learning. These learners come from a generation that grew up alongside the development of the Internet. They have high expectations for personalization, immediacy, responsiveness, and mobility from their educational experiences. They value social networking as a component of their educational experience through interacting with each other and with their instructor.²

Since 2003, there has been a proliferation of web-based applications based on the concept of social networking.³ By using these applications, the dental instructor can promote online connectiveness and social interaction by encouraging students to be accountable to one another, "listening" to frustrations and comments, and engaging students who appear disconnected.⁴

Some of these web-based social networking applications focus on the creation of blogs. A blog is a web page that contains brief, discrete pieces of

information called posts. These posts are arranged in reverse-chronological order (most recent post comes first). Each post is uniquely identified by an anchor tag and is marked with a permanent link that can be referred to by others who wish to link to it. A blog allows interaction in the form of comments written by readers in response to published posts.⁵ Blogs are assumed to aid in brainstorming and generating discussion that encourages reflection and promotes deep learning.⁶

This article reports on a blog established for a biostatistics and principles of research design course offered to dental graduate students. The primary aims of the blog were to provide students with exercises to train them for the exam and to enhance interaction among them and between them and the instructor.

Materials and Methods

The study involved dental graduate students enrolled in a two-credit mandatory biostatistics and research design course in the spring of 2008. These

students were registered for master's or Ph.D. degrees in various dental specialties. Description of the students' background was detailed elsewhere.⁷ Their informed consent for participating in the research was obtained, and they were assured of anonymity. Approval of the Dental Research Ethics Committee of the Faculty of Dentistry, Alexandria University was obtained.

The course used a blended approach in which didactic material was delivered in lectures and exercises were delivered online using a blog,⁸ established using Blogger by Google. At the beginning of the course, the students were informed about the blog and that contributions to it were not graded. The instructor posted exercises about the subjects covered in lectures of the multiple-choice question (MCQ) type. The same types of questions were used in two quizzes and in the final exam to assess students.

The students answered the exercises using the comments feature. The instructor allowed a suitable time period for receiving comments before providing the correct answer. Sometimes students added a post if they had a new question or a thought unrelated to the ongoing discussion. To this and to other comments, the instructor responded with a comment. All posts and comments were automatically provided with a time tag.

Comments were classified as being made by instructor or by students and were further classified into comments answering exercises, comments containing new questions to the instructor, comments in response to other students, or deleted comments. The number of posts and comments was counted.

Time statistics of the blog were analyzed to examine responsiveness to posts by calculating the duration between the time when a post was published and the appearance of the first comment. Similarly, the extent of engagement with a post was assessed by calculating the duration between the appearance of the first and last comments to it.

Students were asked to complete a questionnaire to estimate the number of times they interacted with the instructor in lecture and on the blog and to indicate whether they used the blog. Students who reported not using the blog were asked about their reasons. Students who reported using the blog were asked to give a score of their satisfaction with several possible blog uses on a scale from 1 to 10. In addition, blog users were asked about the specific method they used with the blog.

Comparison of mean satisfaction scores with blog uses was done using the Friedman test because these scores were not normally distributed. Comparison of scores of two uses was done using Wilcoxon signed ranks test. The mean of the three scores given for satisfaction with blog uses related to interaction (interaction with instructor, interaction with colleagues, active interaction, and expression of opinion) was computed, and so was the mean of the three scores given for uses related to training on questions (easy accessibility of questions, offering answers to questions and explanation of difficult parts in the course, and offering exercises in a written form in a fixed place to which students could refer when they wanted). Comparison between these two means was done using Wilcoxon signed ranks test.

Students who printed materials only and students who accessed the blog to read without active contribution were considered one group. Similarly, students who published comments and those who published posts were grouped together. In addition, students who commented on their colleagues' posts and those who received comments from colleagues were grouped together. The mean score in the final exam was compared among students who used the blog by these different methods using analysis of variance followed by the Scheff post hoc test.

Results

Eighty-nine students were registered for the course. Eighty students returned the questionnaire (response rate=89.9 percent). Further analysis will be restricted to these eighty students. Their ages ranged from twenty-four to fifty (mean=28.4, SD=4.9 years). The majority were females (65.9 percent) seeking master's degrees (80.5 percent).

Figure 1 shows the number and types of instructor and student posts. A total of thirty-five posts were published; eight of them were by students including feedback about the blog, quizzes, or exams and an answer to exercises that should have been placed as a comment. The remaining twenty-seven posts were published by the instructor. Most of them were related to exercises and correct answers to questions.

Figure 2 shows the number and types of instructor and student comments. Forty-six comments were posted by the instructor in response to questions raised by students or for correcting wrong answers. A total of 241 comments were added by students, mostly to answer questions in exercises.

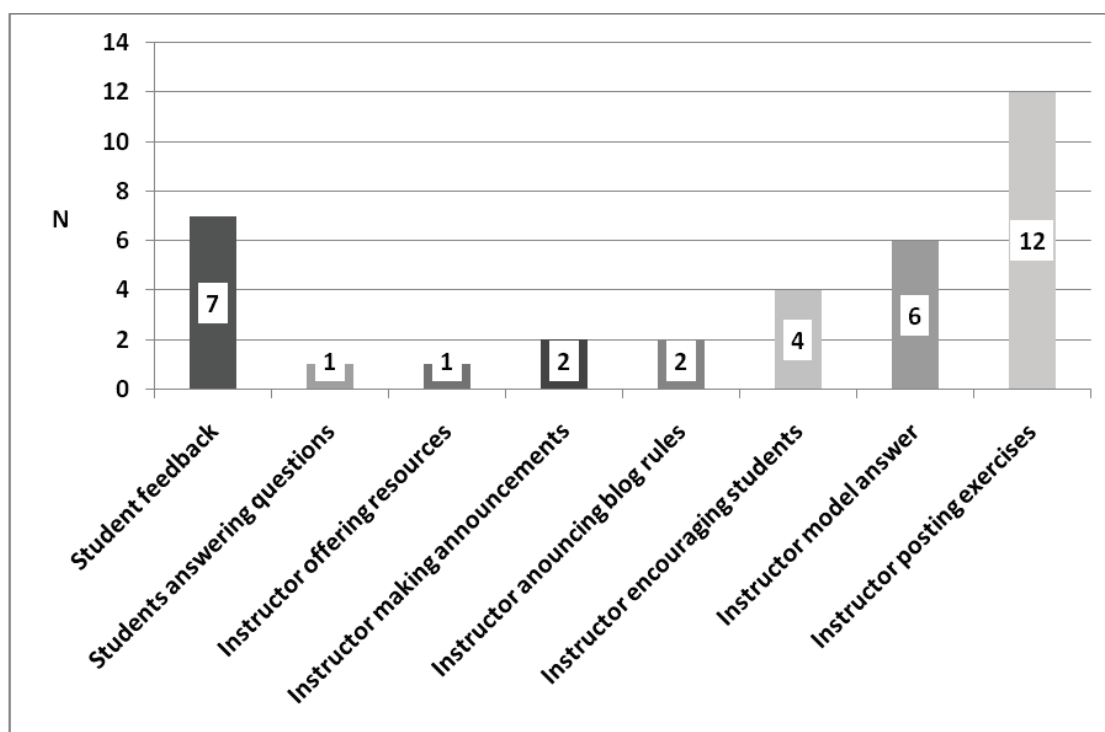


Figure 1. Number and types of instructor and student posts to the course blog

The time between publishing a post and adding the first comment ranged from one to twenty-one days (median=one day). The duration between the first to the last comment on a post ranged from one to seventy days (median=three days). The total number of times for asking questions was 120 and 266 for blog and lecture respectively in the ratio 1:2.2.

Figure 3 shows students' satisfaction scores with the blog. The highest score was given for blog flexibility, which allowed students to use the blog when they wanted, while the lowest score was given to providing exercises in a fixed place to which students could refer when they wanted. There was a statistically significant difference between the score of interaction with instructor and that given for interaction with colleagues (Z of Wilcoxon signed ranks test=2.93, $P=0.003$). The mean of the three scores related to interaction was 9.15, $SD=1.19$. This was significantly higher than the mean of the three scores related to training on exercises, which was 8.73, $SD=1.34$ (Z of Wilcoxon signed ranks test=3.32, $P=0.001$).

Thirty-five students (43.8 percent) added posts and comments on the blog. However, when students were asked in the questionnaire if they used the blog,

seventy-three (91.3 percent) reported using the blog in different ways. Seven students selected more than one reason for not using the blog such as lack of time (selected three times), difficult blog technique (three times), having no computer (two times), and not liking computers (one time).

Figure 4 shows the various methods by which students used the course blog. Most of the students (46.6 percent) only read exercises and comments without making an active contribution.

Table 1 shows the comparison of mean final exam score among students who used the blog by various methods. The difference between the three groups was statistically significant (F of analysis of variance=10.71, $P<0.0001$). Significantly lower scores were observed in students who printed the material or only read exercises and comments compared to those who published either comments or posts (P of Scheff post hoc test=0.003) as well as those who received or sent comments (P of Scheff post hoc test=0.002). No statistically significant difference was observed between students who published comments/posts and those who interacted with colleagues (P of Scheff post hoc test=0.98).

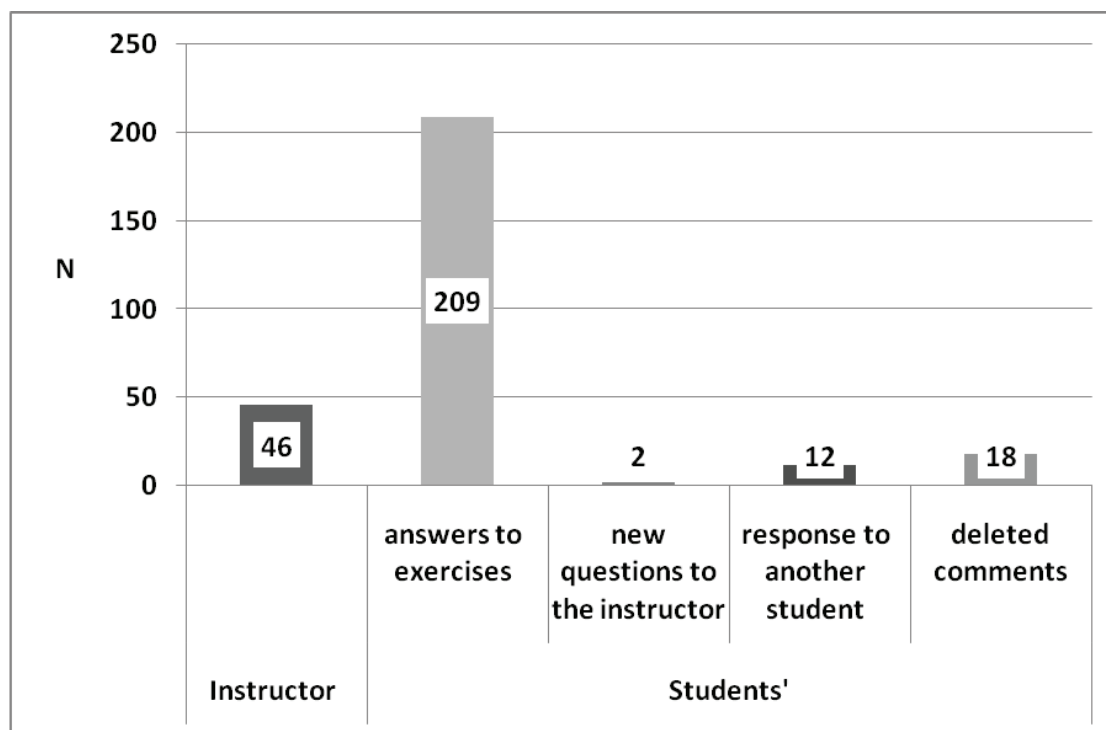


Figure 2. Number and types of instructor and student comments to the course blog

Discussion

Instructors are developing new ways of using information technology to suit the needs of their students and match the conditions of their courses.¹ Blogger by Google is freely available software that offers an opportunity for educators with limited resources to experiment with innovative solutions to existing educational problems with the least investment of time, money, and effort.⁹

The primary aim of the blog in this study was to provide students with exercises. Hence, the majority of instructor posts were to offer exercises and correct answers, and the majority of students' comments were to answer these exercises. However, students were most satisfied with blog flexibility, which is reported to be one of the main advantages of e-learning,¹⁰ and is especially important to postdoctoral students who have work commitments and need flexible schedules for learning.

The other aim of the blog was to enhance interaction among students and between students and instructor. Students interacted with the instructor to solve exercises, ask questions, and express opinions

about the course and the blog. The ratio between the numbers of these interactions online and in lecture was 1:2.2. Some researchers¹¹ have reported that online courses can be more interactive than traditional courses, providing more personal and timely feedback to meet students' needs than is possible in many large face-to-face classes that may have interactivity limitations relating to time, place, and recall.⁹ In another study,¹² 60 percent of students and 80 percent of non-native speakers found it easier to write posts or comments than to speak in class. Other students¹¹ reported that their relationship with the faculty in online courses was the same as in face-to-face classes. Students consider active participation to be the most important factor influencing the success of online learning.¹³

Online students frequently complain that, without feedback, one can never be sure that someone has read the posted message and indicate that specific and timely feedback is important for enhancing task performance.¹⁴ Adult learners who are given positive feedback for their contributions gain a more positive attitude toward learning.¹⁵ Proper timing of posting is important to promote social

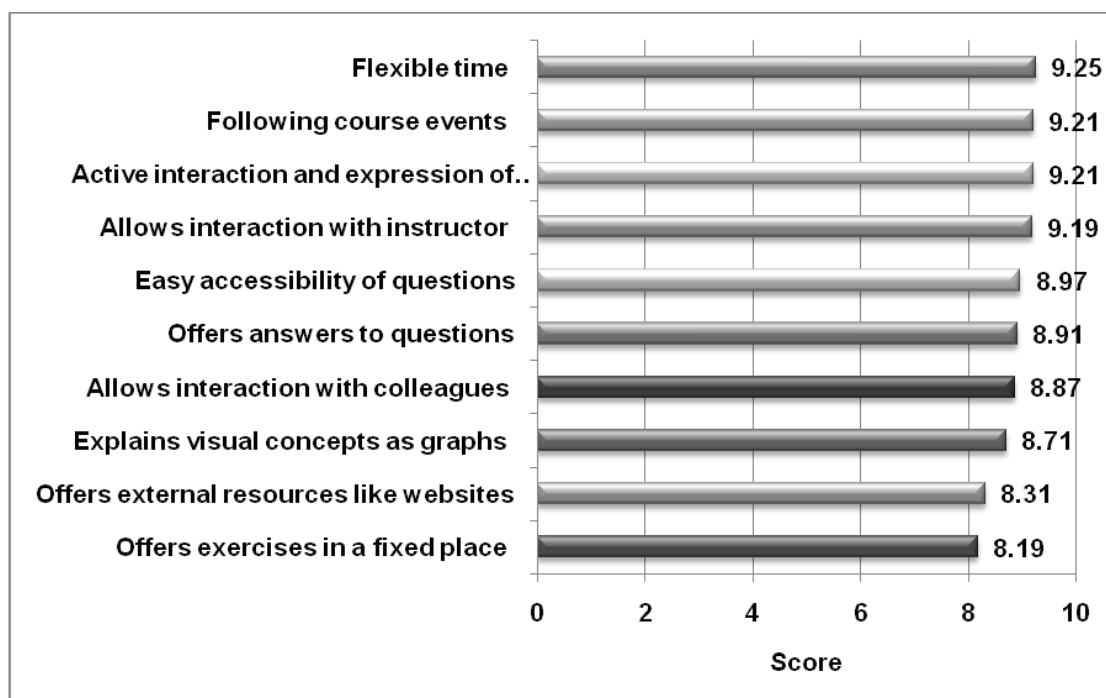


Figure 3. Students' satisfaction scores with various features of the course blog

presence, increase familiarity among members of the learning community, and develop favorable social relationships.¹⁶ According to this study, a time of at least one day must be given for announcements to take effect, and frequency of posting should allow time for all potential bloggers to respond. Some researchers² have recommended accessing discussion forums each day to keep up with the conversations by posting at least one message per day. They warned, however, that learners must be given time for reflection and for critical appraisal of posted information, so frequent posting of simple messages expressing appreciation, agreement, support, and encouragement can be used instead to promote a sense of social presence.

In this study, students' interaction with the instructor was more frequent and satisfactory than their interaction with colleagues. Communication behavior in an online community is influenced by a number of factors, among which is the content area and the level of classroom community.² The nature of the course promoted interaction among students that was limited to agreeing or disagreeing with an opinion or answer to an exercise. The instructor was regarded as the source of knowledge in this online

community. Perhaps in a clinical course with more students' experiences to share, more interaction may be observed among students. In addition, courses with a more homogeneous student population may be expected to show more interaction.

The most frequently reported barriers to using the blog were lack of time and difficult blog technique, which were similar to the reasons reported by undergraduate students in a study of a blog used in a dental terminology course.¹⁷ Another study¹³ conducted among information studies students reported other reasons including the intimidating nature of the discussion board, time delays before replies, and technological problems.

Most of the posts and comments in the present study were published by a small number of students. In many active, successful online communities, a small core of participants generates most of the responses. Some people respond only occasionally, and many (known as lurkers) read but never contribute by commenting or posting.^{18,19} The percentage of lurkers in the present study was 52.1 percent of all blog users. The percent of lurkers in other online communities varies from 45.5 percent to 90 percent.¹⁹

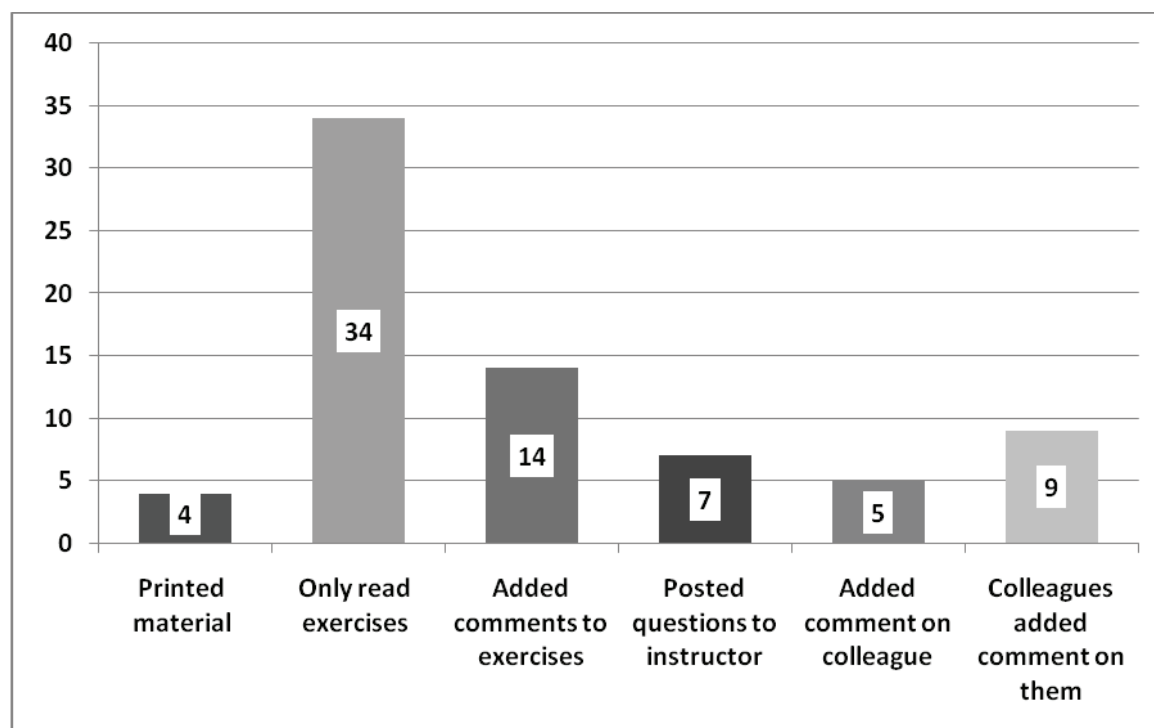


Figure 4. Methods by which students used the course blog

Several reasons were found to explain why lurkers do not participate actively, including the feeling that there is no need to post, wanting the posted information only without wanting to engage in discussion, knowing that posting is not required, and feeling shy about posting.¹⁹ Some researchers¹⁸ acknowledge that just as it cannot be expected that everyone in a classroom will share in discussion, not every member

of an online community will add a comment or a post and that simply adding a comment regardless of its value is not more valuable than silently following the discussion. Other researchers²⁰ place an equal value on interpersonal dialogue (with instructor or colleagues through posting) and intrapersonal dialogue (in which lurkers might engage through reflection on presented material).

Table 1. Comparison of mean final exam score among students who made use of the blog by various methods

	Final Exam Score in Various Groups		
	Printing/Reading Only ^a	Commenting/Posting ^b	Interaction with Colleagues ^b
Min-max	62.70–94.50	80.70–98.30	80.70–97.50
Mean	82.03	90.90	91.53
SD	7.99	5.49	5.32
ANOVA		10.71	
P value		<0.0001*	

*Statistically significant at $P \leq 0.05$.

^{a,b}Statistically significant difference between groups.

In the present study, lower final exam scores were observed among students who did not actively contribute to the blog. These results need to be interpreted with caution because the nonexperimental study design does not preclude the presence of confounding variables that might affect the conclusions. Active contributors might be high achievers who would score higher in the exam with or without the blog. The same result was found in the study¹⁷ of a blog used in a dental terminology course. Another study²¹ partially agrees with this result, finding that students with a greater number of posts had higher exam scores than students with no posts at all whereas students with fewer posts had higher scores than those with a greater number of posts. The researchers explained this situation by suggesting that students with fewer contributions may have had time to think about the information they acquired online than those who spent most of their time posting without reflecting on what they read.

Conclusions

Modifying blog features to suit course nature allowed students in this study to use freely available blog software to gain access to exercises and to interact with the instructor and to a lesser extent with colleagues. The greatest value of the blog appreciated by students was enabling interaction. Students who used the blog actively by posting or interacting had higher final exam scores than those who did not. This draws attention to the importance of interaction in e-learning in particular and in adult learning in general.

Future research involving students' use of blogs in health professions education needs to study the characteristics of active bloggers and the differences between them and lurkers. In addition, an experimental design is needed to study the relationship between blogging and exam scores.

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