Using Internet-Based Newsgroups in Software Engineering Education

Giancarlo Succi, Romana Spasojevic
Department of Electrical and Computer Engineering,
University of Calgary,
2500 University Dr. NW,
Calgary, Alberta, Canada T2N 1N4,
e-mail: Giancarlo.Succi@enel.ucalgary.ca

Keywords
Internet-based newsgroups, software engineering education, virtual labs

Abstract
In this paper, we report on our experience with the internet-based newsgroups as a way to expand class discussions outside the classroom. The study involved two graduate classes and one undergraduate class. Our quantitative analysis of the messages on the newsgroups shows that the students used the newsgroups most often around the "in-class" sessions and the deadlines for the assignments. We believe that, in this way, the discussions initiated during the lectures and students' presentations were extended till fully exhausted by the class. In the feedback the students provided to us, they indicated that the newsgroups sometimes helped them express themselves better.

Introduction
This paper follows the research on the potentials of the electronic communication media in education (Van Dusen 1998, 1997, Isernhagen 1999, Jones 1997, McLellan 1994). We also recognize the negative sides of the electronic communication media applications in education (Crouch and Montecino 1997, Carrasquel 1999). Our research is an attempt to find the ways to balance traditional face-to-face and internet-based communication in education. We concentrate on the application of internet-based communication media to higher education in software engineering.

This paper reports on some aspects of using internet-based newsgroups to extend the course-related discussions outside the class. We performed quantitative analysis of the discussions on the classes' newsgroups. We also report on some of the feedback that we received from the students in respect to their perceptions of the class communication conducted over internet-based newsgroups.

We provided the internet-based newsgroups with the intent to motivate the students to continue class discussions outside the class. We also felt that this mechanism would provide the students with the opportunity to consult each other and the instructor while working on their assignments and assigned projects. The students in all of the classes, subject to this study very well took the suggested communication media.

Study Environment
Students
Our experience is with two graduate classes (classes A and B) and one undergraduate class (class C) in software engineering. The majority of the students did not speak English as their first language (53% in the undergraduate class and from 75% to 80% in the graduate classes). A significant number of graduate students (25% to 50%) were employed full-time during the course.

Communication Channels
To facilitate communication in these courses we developed four communication channels:
1) presentation and discussions of the studied material in face-to-face communication in the classroom;
2) presentation of the course material, presentations of the students' projects, and the reviews of the student projects on the class web site;
3) additional discussions related to the material presented in the classroom and the class web site on the class newsgroups;
4) class organization and maintenance through e-mail distribution lists;

This paper reports on the detailed analysis of the communication that took place in the classes' newsgroups.


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Quantitative Analysis of Newsgroups Communication

There were two newsgroups devoted to the class A discussions in the two main topics of the course. The course lasted for two and a half months. During this period there were 131 messages posted on these newsgroups. Comparing the distribution of the messages with the course schedule we noted the highest number of messages around the "in-class" lectures. Figure 1 represents the distribution of the messages posted on the newsgroup during the two and a half months in which the class took place. It is notable that the activity on the newsgroups decreased in the second half of the course. This was during the period in which the students reported on their individual projects. However, we can note that the peak of the newsgroup activity followed the meetings in the classroom.

Figure 1: Class A newsgroup discussion throughout the course

Class B was provided by 14 newsgroups: general class newsgroup and 13 newsgroups for discussions on student's individual projects. In two and a half months of the course duration, there were 247 messages posted on these newsgroups. The material in this course was presented in three whole-day sessions. The rest of the course was used for the presentations and discussions of the individual student projects. Comparing the distribution of the messages posted to the class newsgroups with the course schedule we came to the same conclusion as for the class A. The highest activity on the class' newsgroups is always around the "in-class" sessions. Figure 2 represents the distribution of these messages throughout the course.

Figure 2: Class B newsgroup discussion throughout the course

Course C was an undergraduate half-course which lasted one semester. During this period, there were 180 messages posted on the class newsgroup and 103 messages exchanged through the e-mail. We noticed a significant fluctuation in the use of these ways of communication throughout the course. The highest activity was noted around the deadlines for the class assignment submissions. In addition to this trend and similarly to the classes A and B, the newsgroups were most heavily used around the "in-class" sessions. The newsgroup was used the least during the preparations for the midterm. Figure 3 represents the distribution of the messages posted on the newsgroup during the course.

Figure 3: Class B newsgroup discussion throughout the course

Figures 4 and 5 display the distribution of the messages on the classes newsgroups throughout the day. Graduate students used the newsgroups most often in the mornings, while
undergraduate students used the newsgroups equally throughout the day.

![Hourly Distribution of Newsgroup Messages (graduate course)](image)

**Figure 4:** Distribution of messages posted throughout a day (courses A and B)

![Hourly Distribution of Newsgroup Messages (undergraduate course)](image)

**Figure 5:** Distribution of messages posted throughout a day (course C)

**Students' Observations Regarding the Newsgroups**

We asked the students to provide some feedback on the use of the newsgroups in their education. Here we report the three most dominant lines in their responses. They suggested that the opportunity to discuss the studied material on the class newsgroups, helped them engage in the discussions for the following reasons:

1. It allowed more time for understanding the discussion and formulating their response,
2. It allowed more time for the students who do not speak English as their first language, and
3. It helped shy students express themselves in a confident manner.

**Conclusion**

In this paper we present our findings related to the dynamics of newsgroups discussions as a function of course schedule. Our results show that the newsgroups were used 24 hours a day, seven days a week. Analysis of the number of messages posted to the newsgroup shows that (1) meetings in the classroom for the lectures and the students' presentations, and (2) the deadlines for the assignment and project deliverables affected the activity on the classes' newsgroups. Graduate students had highest activity on the newsgroups in the morning, while undergraduate students had highest activity in the evening.

The students identified several advantages to using newsgroups as a communication channel in their education. The most dominant ones indicated that they appreciated the chance to take more time in creating well-reasoned arguments.

In the continuation of this research we are looking in the effects of the student learning styles to the effectiveness of different communication media in education.

**Acknowledgements**

This work has been partially supported by a Teaching Development Award funded by the Royal Bank of Canada, by the Canadian National Science and Engineering Council, by the Government of Alberta, and by the University of Calgary.

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