Online Discussions Across Three Universities: Student Participation and Pedagogy*

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From PowerPoint presentations to web-based quizzes to entire classes taught online, technological changes have had a strong influence on pedagogical practices. The initial research into the pedagogical effectiveness of these emerging technologies suggests there are many ways in which they might be useful (Boschmann 1995; Hiltz 1994; Palloff and Pratt 2001). In this paper, we examine student participation on a structured online discussion group that spanned three universities and address two research questions: what explains student participation in online discussion groups and how effective are these groups as pedagogical tools? To address these topics, we draw upon our use of online discussions as a class assignment during the fall semester of 2000. First, we examine previous research and generate several expectations about student behavior and attitudes.

Technology in the Classroom

Student participation in a structured online discussion group offers a number of pedagogical benefits. First, it fosters discussions outside the classroom setting, and it allows for more students to participate than often is possible in a traditional classroom (Althaus 1997; Hall 1993). Students who, after class, have lingering questions or important points they want to raise can access the electronic discussion group. This is especially important in large classes where there is not time for all students to participate.

Second, online discussion groups provide students with opportunities to play a proactive role in their own education. On electronic discussion groups, students can shape debates and focus on issues that are of interest to them much more easily than they can in classroom discussions, where the faculty member usually sets the discussion agenda. Clawson and Rockeymoore's (1999) analysis of participation in an online discussion demonstrates that students will return to topics repeatedly throughout the semester. This type of lengthy and in-depth discussion of course material is impossible in a traditional classroom setting.

Third, discussing and debating class material online helps students to understand the material more fully. By increasing the time students spend "on task," they think about and share their views on course readings and lectures. This should result in improved critical thinking and writing skills. Student confidence in communicating their ideas should also increase as they engage one another on the discussion group. By having a series of exchanges, students are able to clarify and refine their arguments. Along the way, they should gain confidence in their ability to convey their viewpoints effectively.

In our case, we took advantage of online discussion groups' capacity to enable conversations across universities. By electronically "linking" students from our three universities, we expected that the views presented would be more diverse (both because of differences in the student bodies at our three institutions and because the students were exposed to somewhat different readings and lectures in the three courses) than if the online discussion were limited to students from one course. We hoped that grappling with more diverse views aided students, both as they applied course material to the "real world" of politics and as they refined their own belief systems.

Our research addresses two questions related to participation in online discussions. First, who participates most in online discussions? To understand the pedagogical implications of employing a computer newsgroup in a course, it is critical that we examine what factors explain the variation in student participation. Clawson and Choate (1999) found that students who felt more comfortable with computers were more likely to participate in the electronic discussion, and Arch and Cummins's (1989) research demonstrated a relationship between computer experience and computer use for female students. Several scholars argue that professors who use computer technology in their classrooms should be particularly cognizant of providing appropriate training to their students so that technological barriers will not interfere with student learning (Clawson and Rockeymoore 1999; Groeling 1999).

In political science classes, we would expect that political attitudes might predispose some students to participate more than others. For example, Clawson and Choate (1999) found that students who had a greater interest in politics and those who had more extreme political views participated more regularly. The newsgroup provides these highly motivated students an opportunity to share their views with other interested students. In contrast, students who are extremely busy with other aspects of their life may not have the time or motivation to participate in the electronic discussion. Thus, we expect that students who hold jobs in addition to attending college would be less likely to engage in online conversations. There is also evidence that high-performing students are more likely to engage in newsgroup discussions (Althaus 1997; Clawson and Choate 1999).

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It is also important to examine whether there are sex and race/ethnicity differences in participation in the electronic discussion. Clawson and Choate (1999) found that women and men participated on the newsgroup at the same level once other important variables were taken into account (see also Althaus 1997). Wolfe's (2000) research demonstrated that white women were as likely as Latino men and just slightly less likely than white men to participate in computer-mediated discussions. Latinas were least likely to participate in the electronic discussion (although they were much more likely than white women to participate in face-to-face interactions). Wolfe (2000) argues that many white women participate in the computer discourse because they are conscious of the opportunity the electronic communication gives them to interact free from interruption from other (male) students. Latinas (and to a lesser extent Latino men) were more likely than whites to indicate that nonverbal cues are critically important to communication and thus favor face-to-face conversation over computer-mediated discussions. Wolfe (2000) also found that black females were most likely to participate in the computer discussion; however, her sample was extremely small ($n = 3$). Wolfe suggests that black females may not be as inhibited as white females by the stereotype of women as passive and dependent; historically that image has been applied to white women, not black women.

Our second research question is: how effective are online discussion groups as pedagogical tools? Chickering and Ehrmann (2001) caution that for technology to be used successfully in the classroom, professors must use it in a way that is consistent with good teaching practices more generally, e.g., promoting active learning and developing reciprocity and cooperation among students (Chickering and Ehrmann 2001; Paloff and Pratt 2001; Zemelman, Daniels, and Hyde 1998). Incorporating an electronic discussion group into a course clearly meets these two criteria; thus, we expect participation in the online discussion to improve the students' skills and enhance their learning of the course material.

Ocker and Yaverbaum (1999) examined students working in groups to compare the effectiveness of computer-mediated communication versus face-to-face collaboration. They found that the two modes of communication were equally effective in terms of students' learning course material; however, students demonstrated concern with the quality of their discussions when their communication was asynchronous. This pattern of results may be mirrored in our research. Students may learn a great deal from participating in the electronic discussion, yet still feel more confident about the quality of discussion that occurs in class. In our case, class participation allows students to monitor our reactions to comments, which gives them cues regarding what arguments we find most compelling. Students also count on professors to reign in other students when they go off on a tangent, something we did not do on the newsgroup. Thus, in terms of effectiveness, we view newsgroup participation as a complement to class participation rather than a replacement for it.

Methods

In the fall of 2000, each of the authors taught a course on women in the political process at her institution (Purdue University, Union College, or the University of Texas at Arlington [UTA]). These three schools vary on many characteristics, and the students in the three classes reflected these differences. In terms of age, the average student at Union was 20, at Purdue 22, and at UTA 27. The average student at UTA worked far more hours per week (26) than at Purdue (13) or Union (8). Finally, the average family income at UTA was the lowest ($54,467), followed by Purdue ($84,250) and then Union ($94,528). As for similarities among the students, most students in each of the classes were juniors or seniors and were political science majors. The overwhelming majority of the students were female: a full three-quarters at Purdue and Union and two-thirds at UTA. The average grade point average for students at each was relatively high: Purdue students averaged 2.93, Union students averaged 3.1, and UTA students averaged 3.23. At Purdue and UTA, 20% of the students were African American. At UTA, almost 7% were Latino and at Union almost 6% were.

Each course focused on women and politics, examining a wide range of topics from the history of women in the political process to public policy affecting women. The course taught at Purdue, however, had a special focus on African-American women and their unique position in the American polity. We expected the posts from Purdue students to reflect this focus and for these students to share their insights with the students from Union and UTA. Though we coordinated course material, including lecture topics and some readings, we each had our own set of assignments for our courses. We all required class participation, newsgroup participation, and in-class exams. Students at Purdue and UTA were required to write a research paper; Union students wrote a reading journal. Additionally, the weight given to the newsgroup participation varied from 10% (UTA) to 20% (Union and Purdue). We all required students to post roughly once per week; however for Union students to earn an A grade for the newsgroup portion of their final grade they had to post more than once per week.

At the beginning of the academic term, students were instructed on newsgroup use. They were given written instructions as well as a hands-on tutorial in computer labs. We assured them that the newsgroups would be "their space" and that we would not participate in the discussions. Instead, each week, we provided "prompts" that consisted of questions and/or statements that were intended to facilitate and motivate discussion among students. For example:

- Has feminism helped or harmed the contemporary (post-1965) women's movement?
- Have women achieved sufficient political power in the U.S.? If not, what would be the best way for women to gain more political power?
- What effect do women have on government? Is there a "different voice" that women bring to the business of governing? If so, what policies might be affected by their different voice?

To assess students' participation in the newsgroup and the pedagogical effectiveness of the newsgroup, we collected a variety of data from students enrolled in these three courses. In order to determine their newsgroup participation we tallied the number of posts each student made throughout the course of the semester. We included only posts related to the course and/or course material, omitting from the analysis any posts that were not course-related. Across the three universities, we have participation data for 65 students. We also administered two surveys—one at the beginning and one at the end of the term. The first survey contained questions regarding attitudes, behaviors, and characteristics we expect to be

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related to participation in the newsgroup. In total, 57 students completed this survey (18 from Union, 24 from Purdue, and 15 from UTA). The second version contained questions assessing the pedagogical effectiveness of the online discussion assignment, to which 59 students responded (18 from Union, 27 from Purdue, and 14 from UTA).

Student Participation on the Newsgroup

Overall, the mean number of posts per student for the term was 12.95 (standard deviation = 6.18). There was significant variation in newsgroup participation across the three universities. Union students posted significantly more messages (mean = 18.11) than did either Purdue (mean = 11.00; $t = 4.56$, $p < .001$) or UTA students (mean = 10.94; $t = 4.29$, $p < .001$). These variations across universities are interesting, and perhaps these differences reflect norms present at each institution. As we noted, these three institutions differ in significant ways. Union is a liberal arts college and, as such, is more selective in its admission requirements than state schools traditionally are. A more likely explanation, though, relates to the grading differences across the three courses. Union students were required to post more than one message per week to earn an A for their newsgroup participation. No such requirement existed for the Purdue and UTA students, who were expected to post approximately one message per week.

To understand which factors influence student newsgroup participation, we estimated an OLS regression model with number of posts as the dependent variable. We included four types of independent variables: student characteristics; demographics; political attitudes; and computer attitudes. The student characteristics include grade point average, number of hours worked per week, major (coded one for political science majors and zero for all other majors), and university. For the latter, we included dummy variables for both Purdue and UTA students. To examine the influence of demographics on participation, we included three dummy variables: one each for black, Latino, and female students. Political interest and extremity of ideology are the two political attitude variables that we included in the model. We measured both attitudes using 7-point scales,[1] but we folded the original liberal-conservative scale into a 4-point scale to capture ideological extremity. Moderate students scored a one on the folded scale, while students with very liberal *or* very conservative views were coded as four on the new scale. Less extreme liberals and conservatives received scores of two or three, depending on their initial response. Finally, we include a comfort-with-computers measure as our only computer attitudes variable.[2] We collected data for all of the independent variables from the survey that we administered on the first day of class.

Five of these 11 independent variables are significantly related to newsgroup participation (see Table 1). Purdue and UTA students posted fewer messages than Union students, but none of the other student characteristics (GPA, hours worked, and major) were related to participation rates. Black students posted fewer messages than white students. The participation rates of Latino versus white or female versus male students did not differ. Students with a higher level of interest in politics posted more frequently than did students with less political interest, although extremity of ideology was not related to participation. Finally, and surprisingly, students who felt more comfortable using computers posted *less* frequently than students who felt less comfortable with computers.

The Pedagogical Effectiveness of the Newsgroup

Given past research suggesting that newsgroups generate discussion beyond that which occurs in class, aid students in taking a proactive role in their education, and promote greater understanding of course material (Althaus 1997; Clawson and Rockeymoore 1999; Hall 1993), we were hopeful the newsgroup participation would be pedagogically beneficial to our students. The second survey we administered contained many questions regarding the pedagogical effectiveness of the newsgroup. First, we asked students to rate how much improvement they experienced in each of seven skills due to their participation on the newsgroup. These skills were: confidence in using computers; confidence in communicating; writing skills; critical thinking skills; understanding course material; applying course material to the "real world"; and understanding diverse points of view.

Table 1
Variation in Newsgroup Participation

	Unstandardized Coefficients	Standardized Coefficients	Standard Errors
Student Characteristics:			
Purdue student	−7.32***	−.59	1.68
UTA student	−5.98**	−.43	2.03
Grade point average	.37	.03	1.61
Number of work hours per week	−.03	−.07	.06
Political science major	.45	.03	1.72
Demographics:			
Black	−3.96+	−.23	2.13
Latino	−1.93	−.07	3.03
Woman	−.43	−.03	1.63
Political Attitudes			
Interest in politics	1.10*	.25	.53
Extremity of ideology	−.84	−.13	.77
Computer Attitudes:			
Comfort with computers	−2.99*	−.28	1.27
Constant	24.05**		
Number of Cases		53	
Adjusted R^2		.42	

Note: The Purdue student, UTA student, political science major, black, Latino, and woman variables are dummy variables with 1 representing the name of each variable. Grade point average, number of work hours per week, interest in politics, extremity of ideology, and comfort with computers are coded so that a higher number corresponds to, respectively, a higher grade point average, more hours worked, more interest, a more extreme ideology and more comfort with computers. Significance levels are indicated as follows: +$p < .10$; *$p < .05$; **$p < .01$; and ***$p < .001$.

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Table 2
Skill Improvement Resulting from Newsgroup Participation

Skills	Mean Rating	Standard Deviation
Applying course material to "real world"	2.95	.93
Understanding diverse points of view	2.95	.97
Critical thinking skills	2.81	.88
Understanding course material	2.77	.85
Confidence in communicating	2.26	.88
Writing skills	2.23	.80
Confidence in using computers	1.77	.93

(N = 57)
Note: Responses were coded as follows: 1 = No improvement; 2 = A little improvement; 3 = Some improvement; and 4 = A great deal of improvement.

The students experienced the greatest improvement in the areas of applying course material to the "real world" and understanding diverse points of view (see Table 2). On a 4-point response scale where three represents "some improvement," the mean for both of these items was 2.95.[3] The students felt that the newsgroup helped them improve their critical thinking skills and their understanding of course material slightly less (means of 2.81 and 2.77, respectively). On average, the students rated their improvement in confidence in communicating and writing skills as much closer to "a little improvement" than "some improvement" (means of 2.26 and 2.23, respectively). Finally, participation in the newsgroup only slightly improved the students' confidence in using computers (mean = 1.77).[4]

In addition to rating how much the newsgroup participation helped them improve upon the seven skills, the students also rank ordered how well each of four assignments helped them in six of these seven areas.[5] The four assignments were newsgroup participation, class participation, exams, and a paper (for the Purdue and UTA students) or a reading journal (for the Union students). For each skill, students ordered the four assignments from most to least helpful (coded 1 and 4, respectively). Table 3 presents the mean ranking of each assignment for the six skills, along with the ordinal ranking of these means (in parentheses). This ordinal ranking indicates not only which assignment was most (or second most, etc.) helpful for each skill but also whether the mean ranking for one assignment is significantly different from the mean ranking for the other assignments. To determine if pairs of mean rankings differed significantly, we conducted a series of paired samples *t* tests. Assignments with the same ordinal ranking for a specific skill do not differ significantly from each other.

When compared to the other assignments, class participation and newsgroup participation were the most helpful assignments for gaining confidence in communicating. While the mean ranking for class participation is higher than the ranking for newsgroup participation (1.53 versus 1.83, respectively), the difference between these mean rankings is not statistically significant. Students ranked newsgroup participation as the second most helpful assignment for understanding diverse points of view, and applying course material to the "real world." For each of these two skills, the students found class participation to be the most helpful, the paper or reading journal to be the third most helpful, and the exam to be the least helpful. The students rated the paper or reading journal the most helpful for improving their writing skills (mean = 1.61), followed by the exam and newsgroup participation (means of 2.12 and 2.41, respectively). Participating in class discussions was the most helpful assignment for thinking critically (mean = 1.86). In contrast, students' rankings of the newsgroup participation, the paper/reading journal and the exam did not differ significantly for this skill (2.66, 2.73, and 2.73, respectively). Not surprisingly, class participation was ranked last for helping the students improve their writing skills. Finally, class participation helped the students best understand the course material (mean = 1.17), while the mean rankings of the other three assignments were all close to three and not significantly different from each other.[6]

Conclusion and Implications

Our findings suggest that while newsgroups can be a powerful pedagogical tool, not all students participate at the same rates. Among demographic characteristics, race had a significant effect on newsgroup participation; blacks (of whom all but one were women) were the least likely to participate. This finding counters Wolfe (2000) and is especially interesting given that the course at Purdue was about African-American women in the political system. However, this result may be unique to the specific black students enrolled in our courses. Two were student athletes in major sports programs at Purdue. Obviously, athletics require a tremendous time commitment that hampers participation in other out-of-class

Table 3
Effectiveness of Four Assignments in Helping Students with Specific Skills

Skills	Newsgroup Participation	Class Participation	Paper/Reading Journal	Exam
Gain confidence in communicating	1.83 (1)	1.53 (1)	3.14 (3)	3.47 (4)
Understand diverse points of view	2.00 (2)	1.31 (1)	3.09 (3)	3.60 (4)
Apply course material to "real world"	2.12 (2)	1.39 (1)	3.03 (3)	3.42 (4)
Improve writing skills	2.41 (2)	3.90 (4)	1.61 (1)	2.12 (2)
Think critically	2.66 (2)	1.86 (1)	2.73 (2)	2.73 (2)
Understand the course material	3.00 (2)	1.17 (1)	2.85 (2)	2.97 (2)

(N = 58 or 59)
Note: Entries are the mean ranking of the assignment for each skill, where a ranking of 1 indicates the most and a ranking of 4 indicates the least helpful assignment. The numbers in parentheses indicate the ordinal ranking of these means for each skill. The means for assignments that have the same ordinal rank for a skill do not significantly differ from one another.

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activities. In addition, two black students were involved in an extensive range of extracurricular activities (often at the request of Purdue administrators). These students were stretched thin and finding time to post on the course newsgroup was challenging. This circumstance may be similar to the situation faced by many black collegians, and thus may not be so unique to our students. Because there are so few black students on traditionally white campuses, they are asked to serve on university committees, to assist with recruitment, and to interact with alumni at a rate much higher than the white students. Clearly, further research needs to be conducted to examine racial differences in electronic participation.

One finding that ran counter to our expectations was that students who were less comfortable with computers were more likely to participate on the newsgroup. There are several possible explanations for this. Perhaps students who had less experience found the newsgroups more novel and thus were more likely to want to try something new. Perhaps these relative computer novices found the newsgroups a "user-friendly" introduction to computer use and thus were encouraged in their computer skills and inclined to want to use the newsgroups frequently. Given Clawson and Rockeymoore's (1999) findings that appropriate training on the use of technology is key to its effective classroom use, perhaps the extensive hands-on training and written instructions aided in reducing the learning curve for relative computer novices.

Finally, our results indicate that the newsgroup was a pedagogically effective assignment. Compared with other elements of the course, students thought the newsgroup was especially effective in helping understand diverse points of view and helping apply course material to the "real world." Further, there were only slight differences across schools in the extent to which students found the newsgroup effective in teaching these skills. When students were asked to rank order class assignments, in-class participation was the most helpful for most of the skills assessed, followed by newsgroup participation for many skills. Considering only the effect the newsgroup had on their learning, the students felt the newsgroup was the most helpful in teaching them to communicate.

In this paper, we assessed pedagogical effectiveness by relying on student feedback gleaned from a survey administered at the end of the semester. While it is certainly important to examine student perceptions of the newsgroup, it is also important to gauge the newsgroup's effectiveness in other ways. In future research, we plan to systematically analyze the content of the newsgroup posts to make an independent judgment regarding the effectiveness of on-line discussions.

Clearly, technological advances hold a great deal of promise as pedagogical tools. As these technological innovations are incorporated into courses more regularly, research must continue in order to evaluate its pedagogical effectiveness and to insure that all students are in a position to take advantage of its educational benefits.

Notes

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1. Question wordings for these two items were, respectively: "Some people are not interested in politics, while others are quite interested. How interested are you in politics?" and "Which point on this scale best describes your political views?"

2. "How comfortable do you feel using a computer?" was the wording for this question, which had four possible responses (very, somewhat, not very and not at all).

3. The complete response scale for each item was as follows: 1 = No improvement; 2 = A little improvement; 3 = Some improvement; and 4 = A great deal of improvement.

4. Differences across the universities in these improvement ratings were minimal. Students at UTA felt that the newsgroup helped them to improve their understanding of the course material more so than did students at Purdue (means of 3.21 and 2.56, respectively; $t = 2.16$, $p < .05$). UTA students also indicated the most improvement in applying course material to the "real world." Their mean rating of 3.43 was significantly higher than both the rating of Purdue students (mean = 2.84; $t = 2.08$, $p < .05$) and Union students (mean = 2.72; $t = 2.42$, $p < .05$).

5. The one excluded area was confidence in using computers, because the newsgroup was the only assignment that required use of a computer to complete the assignment.

6. For the most part, the mean rankings of the four assignments did not differ across the three universities. Purdue students were more likely than UTA students to think that the class paper helped them to think critically (means = 2.48 and 3.29, respectively; $t = 2.32$, $p < .05$), while UTA students ranked the exam as more helpful for critical thinking (mean = 2.14) then did Union students (mean = 3.17; $t = 2.80$, $p < .05$). In terms of helping them understand diverse points of view, Purdue students found class participation more useful than did UTA students (means = 1.15 and 1.57, respectively; $t = 2.44$, $p < .05$). Finally, the mean ranking of the newsgroup for helping understand diverse points of view was lower for Purdue students (2.30) than either UTA (1.64; $t = 2.37$, $p < .05$) or Union students (1.83; $t = 2.22$, $p < .05$). This is probably the case because the Purdue classroom was quite diverse (in large part due to the focus on black women) and that diversity was diluted when participating on the newsgroup.

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