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ABSTRACT

This study investigated the extent of student interaction in undergraduate classrooms and the relationship between instructor techniques and interaction, as well as differences in interactions experienced by freshmen compared to those of juniors and seniors (upperclassmen). Survey questionnaires were completed by 36 instructors, 226 freshmen, and 566 upperclassmen enrolled in social science and humanities courses at 2 public research universities. Analysis of the questionnaires indicated that freshmen viewed classroom participation more favorably than did upperclassmen; they felt somewhat freer to ask questions in class and believed, to a greater extent than upperclassmen, that their teachers tolerated different opinions. Both freshmen and upperclassmen named praise, humor, and a supportive classroom atmosphere as the conditions most encouraging to their participation, while criticisms and "put downs" for wrong answers were most discouraging. Faculty cited the use of student ideas in class and asking for elaboration on questions/answers as significantly more encouraging of participation than did students. Faculty also viewed the use of student names as significantly more encouraging of participation than did freshmen. Compared to their male counterparts, female freshmen and upperclassmen reported significantly greater encouragement for participation from praise and supportive classroom atmospheres. Two figures and six data tables are appended. (Contains 36 references.) (SW)

ENGAGING CLASSROOMS: STUDENT PARTICIPATION AND THE INSTRUCTIONAL FACTORS THAT SHAPE IT

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ENGAGING CLASSROOMS: STUDENT PARTICIPATION AND THE INSTRUCTIONAL FACTORS THAT SHAPE IT

By Katherine C. Reynolds and Claudia E. Nunn

Abstract. This study investigates the extent of student interaction in undergraduate classrooms and the relationship between instructor techniques and interaction. It also explores the differences in patternss and perceptions of interaction between freshman students and upperclass (junior and senior) students. While a number of college student studies have indicated positive relationships between classroom participation and learning, motivation, and problem solving skills, there is little empirical evidence concerning instructor behaviors that influence student interaction. The current study investigates these behaviors and compares their effectiveness with freshmen/upperclassmen, males/females. This survey research was conducted at two public universities, using a sample of 792 students and 36 instructors. Findings indicate that freshmen view participation more favorably than do upperclassmen. However, upperclassmen and freshmen hold similar views -- not altogether shared by their instructors -- about which teaching techniques encourage or discourage interaction in the classroom. Furthermore, male and female students hold significantly different views about the influence of some instructor behaviors on their participation.

Introduction

Although the vast majority of college teachers are genuinely interested in enhancing student learning in their classrooms, there is little definitive research evidence to support their efforts. Findings on factors that might stimulate student learning are inconsistent, and attempts

to explain the learning process are limited by myriad confounding variables.

Nevertheless, as educators and cognitive psychologists have expanded the body of educational research over the past several decades, at least one variable--student classroom participation--has continued to surface as a factor that correlates positively with certain types of learning. For example, approximately 25 years of research have supported the premise of a positive relationship between college students' verbal participation in class and motivation, satisfaction, learning, and problem-solving ability (Astin, 1977; McKeachie, 1970; Smith, 1980). Participation also has been linked to greater levels of content acquisition (Johnson & Butts, 1983), retention of material (McKeachie, 1978), and perceived value of the course/subject (Smith, 1980). Reviewing studies collected over more than three decades, Pascarella and Terenzini (1991) concluded that classroom discussion is particularly effective in increasing higher order cognitive skills (e.g., critical thinking, problem solving), although discussion is no more effective than lecture in imparting subject matter knowledge.

Recently, the likelihood of a positive correlation between classroom participation and learning has been further supported by constructivist theory that asserts, "When students are engaged in actively processing information in new and personally meaningful ways, they are far more likely to remember it and apply it in new situations" (King, 1993, p. 30). Constructivist concepts view teachers as "cognitive guides," and perceive students as "sense makers" who learn best from approaches such as guided discovery, classroom discussion, and collaboration in academic tasks (Mayer, 1996, p. 154). Cognitive psychologists have demonstrated that when learning is interactive, information is more readily stored and retrieved from storage in long-term memory and, therefore, more readily available for application to new situations (Gagne,

Yekovich, & Yekovich, 1994; Gredler, 1992; Wittrock, 1978).

Even while evidence of these positive effects of student participation has increased, actual participation in the college and university classroom has remained surprisingly low. Two studies, conducted many years apart, share remarkable consistency in finding that, on the average, undergraduate student participation occupies only 3.56% (Barnes, 1983) and 5.86% (Nunn, 1996) of class time. A third study, using data from small liberal arts colleges, found 14% of class time devoted to student interaction (Smith, 1983). When students do speak out, a few students take up the majority of the interactive time (Fassinger, 1996; Howard, Short, & Clark, 1996; Karp & Yoels, 1976; Nunn 1996) and the interaction is more likely to be initiated by students than by teachers (Howard, Short, & Clark, 1996). The gulf between findings concerning the value of classroom interaction and actual student participation may be typical of the substantial distance between research and practice in any number of areas. In this case, however, some of that gulf might be explained by our limited understanding of what to practice. Variables that may promote interactive classrooms include factors about the students, the teachers, the group dynamics, the environment, or various combinations; and there is scant confirmation about which of these have the greatest impact. For example, there is little agreement in the research literature about the degree to which teacher behaviors can make a difference. Fassinger (1995) studied undergraduate participation at a small liberal arts college and found that individual student traits and class group characteristics were more positively correlated than instructor behaviors. On the other hand, Auster and MacRone (1994) and Nunn (1996) found that certain specific teacher behaviors in the classroom positively impacted student participation.

Teachers who are interested in making a difference, however, know that the one factor within their control is their own behavior. Therefore, it may be especially important to support them with information about the influence of various instructional strategies on their students; and a number of analysts have called for empirical research into the effectiveness of instructors' techniques in the college classroom (Bonwell & Eison, 1991; Elner, 1983; Mentkowski & Chickering, 1987).

Additionally, differences in the effects of instructor behaviors on different groups and types of students is a very real possibility which merits ongoing investigation, since earlier results are inconclusive. For example, several early studies found males more likely to assert themselves verbally in class than females (Brooks, 1982; Karp & Yoels, 1976). In 1990, however, Crawford and MacLeod, found this to be the significant pattern only at a small college, but not among university students. Howard, Short, and Clark (1996) found student gender to be a significant predictor of student interaction (with females less likely to participate), but not as significant as student age, frequency of class attendance, or time of day (morning, afternoon, evening) for holding class. On the other hand, Cornelius, Gray, and Constantinople (1990) found that neither the students' nor instructors' genders significantly affected classroom participation.

While the study reported here also investigated gender differences in levels of participation and the effect of various instructor techniques on participation, it was particularly concerned with possible differences among freshmen and upperclassmen. As first time college students attempting to adapt to new environments, freshmen may be more sensitive than upperclassmen to "signals" from their instructors and peers regarding participation in classroom

discussion and more alert to suggestions and role modeling. Therefore, professors need to understand how their behavior affects various groups of students so they might adjust their behavior accordingly. There is a limited body of research on classroom interaction among freshmen and their teachers, but it does offer building blocks for additional studies. For example, freshmen report substantial levels of boredom, which correlate positively with low levels of student-faculty interaction (Aldridge & DeLucia, 1991). Researchers specifically studying college freshmen have found positive effects on learning from certain facilitating in-class teaching strategies, such as repetition and elaboration of student answers/comments, as well as from increased student interest in course content and classroom activities (Moody, 1993; Wilkie and Redondo, 1996).

The questions addressed by this study build upon and extend our understanding of college classroom interaction by asking:

* How much student participation occurs in university classrooms?
* Which instructional techniques correlate with student participation?
* Do freshmen and upperclassmen differ in their levels of participation, motivation to participate, or views about participation?
* In what ways do students and instructors differ in their views about classroom interaction and the factors that contribute to it?

Method

The study was conducted at two sites, both public research universities, one in the Northeast and one in the Southeast. The student sample consisted of undergraduates enrolled in

social science and humanities courses; their instructors comprised the faculty sample. Usable responses to student and faculty surveys were generated from 566 upperclassmen (primarily juniors and seniors) in upper-level classes and 226 freshmen in introductory classes, as well as 36 instructors (including some from co-teaching instances). To control for some possible contextual differences among the classes in which surveys were conducted, the sample was purposively limited to classes with a range of 15 to 44 students (a size where both participation and avoidance of participation were deemed possible) and to classes with instructors who were identified by administrators and/or peers as having "very good" teaching reputations.

A pilot study was conducted to ascertain faculty and student perceptions concerning which instructor techniques had positive effects on classroom participation; and the results of that study, along with a review of the literature, were used to develop the student and faculty survey instrument. Both the student and faculty instruments utilized similar items, asking respondents to report frequency of participation, perceptions about the value of participation, and instructor behaviors that might affect participation. Questions concerning behavior asked for information (on a 5-point Likert-type scale from 1=greatly discourages to 5=greatly encourages) about the influence on participation of techniques such as praise, use of student ideas, criticism, grading for participation, and use of humor. Additional questions sought information about perceptions concerning preferred amounts of classroom interaction and fear about participating.

The survey instruments were tested and refined using a non-sample group of faculty and students. Analysis revealed that the Cronbach's internal reliability for the student survey was .71, which was deemed adequate for an effective instrument (Gable, 1986).

Limitations

While this study compares upperclassmen and freshmen, these students' circumstances differ not only in their progress toward graduation, but also in other contextual areas. Most importantly, the two groups were surveyed at different points in time and at different institutions. While the institutions are similar in size and are both public doctoral-granting universities, they inevitably create different backdrops for classroom experiences. In addition, the results cannot be generalized to students at other types of colleges, such as two-year colleges or small liberal arts colleges.

Like much survey research, this study is limited by the possibility of uncontrolled variables that could influence respondents' perceptions at the point in time they complete the survey instrument. For example, when respondents are asked to give information about their classes in general, rather than about the class in which they complete the survey, recent experiences in the class at hand may still substantially influence answers. This limitation might appropriately be addressed with correlation analysis from classroom observation data, especially with regard to levels of participation and the instructor behaviors that encourage or discourage it. Although observations were not conducted to gather data concerning the comparison of freshman and upperclassman participation, an earlier study that included such triangulation (Nunn, 1996) did find that observations validated survey responses concerning instructor techniques that encouraged participation. Unless noted otherwise in the results discussion, the data reported here concern survey questions that asked respondents about participation in general -- i.e., in all classes, rather than just in the one they were attending when they completed the survey.

Results

Levels of Participation

The levels of participation reported by both freshmen and upperclassmen were somewhat higher than anticipated, considering earlier findings about undergraduates (Barnes, 1983; Smith 1983). As shown in Figure A, the largest proportion of both upperclassmen (42%) and freshmen (43%) respondents indicated they participated in class discussion "sometimes." However, more upperclassmen than freshmen (33% vs. 19%) reported participating "infrequently" or "almost never" in class discussions.

When asked whether they ever felt fearful about participating in class, the largest proportion of freshmen and upperclassmen responded "infrequently" or "almost never" (see Figure B). However, as would be expected from the frequency of participation results reported above, slightly more freshmen (63%) than upperclassmen (58%) indicated they felt fearful about participating "infrequently" or "almost never," while more upperclassmen (12%) than freshmen (4%) reported feeling fearful about participating "frequently" or "almost always."

Some perceived fear may stem from students' doubts about their subject matter knowledge; and when asked about reasons for not participating in class, freshmen most frequently listed (from a group of 8 possible statements), "I don't feel I know enough about the topic," "I am tired," or "I am not very interested in the topic." Other often mentioned reasons for lack of participation were: "I am by nature a quiet person," and "I am thinking about other things." Far less frequently noted were, "The teacher doesn't provide a supportive atmosphere," and "The other students don't provide a supportive atmosphere."

Instructor Techniques and Participation

College freshmen and upperclassmen named praise, humor, and a supportive classroom atmosphere as the strongest encouragers of their participation. Criticisms and put downs for wrong answers were described as strongly discouraging participation.

However, there were significant differences in how freshmen and upperclassmen viewed some other instructional techniques (see Table 1). For example, while grading for participation and asking for elaboration on student questions/answers were seen as encouraging participation in general, these items were viewed as significantly stronger encouragers by freshmen than upperclassmen ($p < 0.001$), as was instructors' use of student names ($p < 0.05$). On the other hand, upperclassmen found the use of student ideas in the classroom and praise from the instructor to be significantly more encouraging to their participation than did freshmen.

Male and female respondents differed significantly in perceptions about some factors they saw as discouraging or encouraging classroom interaction, and the directions of these differences were shared among freshmen and upperclassmen (see Tables 2 and 3). Female students reported instructor criticism and put downs for wrong answers as significantly stronger discouragers of participation than did male students, and they named praise and supportive atmosphere as significantly stronger encouragers. Female freshmen also described use of humor as significantly more likely to encourage participation than did freshman males. While upperclassmen and their teachers held largely similar views about behaviors that encouraged participation, freshmen students diverged somewhat more from the views of their teachers (see Tables 4 and 5). Upperclassmen and their instructors agreed in rating praise, use of humor, creation of a supportive atmosphere, use of student ideas, and use of student names

as strong factors in encouraging participation. However, teachers felt that asking for elaboration on students' answers was a significantly stronger encourager of participation than did students ($p < 0.05$). Additionally, teachers viewed put downs for wrong answers as stronger discouragers of participation than did students ($p < 0.05$).

Freshmen and their instructors also saw praise, humor, and a supportive atmosphere as strongly encouraging interaction; and they found put downs for wrong answers and criticism as greatly discouraging. However, faculty named the use of student ideas in class and asking for elaboration on questions/answers as significantly more encouraging of participation than did students ($p < 0.001$). Faculty also viewed the use of student names as significantly more encouraging than did freshmen students ($p < 0.05$).

Since the types of questions asked by instructors also may influence participation, survey respondents were asked to note the degree to which their instructors used open ended v. memory-type questions. Freshman respondents reported far greater reliance on the latter, with 35% noting their instructors ask "mostly memory-type questions" and 15% noting their instructors favored "mostly open-ended questions." Among the upperclassmen, only 8% reported instructors using "mostly memory-type questions," compared to 46% answering "mostly open-ended questions."

Views About Participation

Important differences in views about participation surfaced when upperclass and freshman responses were compared (see Table 6). Most upperclass students and their teachers preferred spending less than 20% of class time in student participation. However, freshmen

students and faculty wanted far more time for interaction, with most indicating that more than 40% of class time in student participation was ideal.

Not surprisingly, considering the divergent views about time spent in participation, freshmen students felt more positively about the value of classroom participation than did upperclass students (see Table 7). Specifically, freshmen (M=4.24) believed participation to be more worthwhile than did upperclassmen (M=3.87). Furthermore, freshmen (M=4.46) felt somewhat freer to ask questions in class than did upperclassmen (M=4.20); and freshmen (4.25) believed their teachers tolerated different opinions to a greater extent than did upperclassmen (4.04). Teachers in freshmen classes also were in stronger agreement than their colleagues in higher level classes that participation is worthwhile and that students in their classes feel free to ask questions. However, instructors in more advanced courses voiced stronger agreement concerning when asked whether faculty tolerated different opinions in the classroom.

Thus, we see that upperclass students report lower levels of participation in classroom discussion than do freshmen, feel more fearful about participating, and rate the participation that occurs as less worthwhile. Furthermore, the results suggest that faculty teaching upper level undergraduates and their students actually prefer less participation than do freshmen faculty and students.

Discussion

Although the reported frequency of participation was somewhat higher than anticipated among both freshmen and upperclassmen, this fortunate finding should be tempered by the

recognition that frequency of classroom participation does not necessarily correspond with levels of meaningful interaction. Participation can range from a one-word answer to a question about a room temperature preference to a prolonged engagement in Socratic dialogue. In fact, over one-third of the freshmen in this study reported that their teachers ask mostly memory-type questions (compared to 15% who reported mostly open-ended questions), indicating that a fair amount of participation may constitute very short answers. This finding, as well as prior research about low levels of participation in other college settings and the cognitive benefits stemming from classroom interaction, suggests that many faculty need to find ways to increase the amount of interaction in their classrooms. In their attempts to increase the period of time spent in student participation, instructors need to work toward involving a variety of students and engaging students in a meaningful way.

Clearly, the findings indicate that both students and faculty feel that certain instructor behaviors can influence participation. However, teachers' perceptions of which behaviors make a difference are not always shared by students. Undergraduates at all levels, for example, reported that the use of humor is a stronger encourager of participation than their instructors perceived. Teachers, on the other hand, put far more weight than their students on the encouraging potential of probing for elaboration on questions/answers. Two factors that encourage participation--praise and the use of student names--stand out as sharing high consistency among all levels of student respondents and their teachers. The earlier Nunn (1996) investigation that included triangulation from classroom observations also found praise and use of student names achieved significant positive correlation in terms of observed behavior and observed student participation. However, the observations also showed that in practice

instances of praise and using names were far less frequent than instances of questioning, asking for elaboration, and voicing acceptance of student answers (e.g., "yes," "uh huh").

Faculty at all undergraduate levels tend to feel more positively than students about the value of participation and the classroom climate they have established to encourage it. Upperclass students, in particular, report less favorable perceptions than freshmen and than faculty about their freedom to ask questions and about their teachers' tolerance of difference opinions. Therefore, it is not surprising that upperclass students find classroom participation less worthwhile and report lower frequencies of participation.

Numerous explanations, all speculative, could account for these differences between newer college students and their more experienced counterparts. For example, upperclassmen may be concentrating more on subjects in their majors and, therefore, "buckling down" to note taking, test passing, and moving toward graduation. Freshmen, on the other hand, may be experimenting with courses outside their major or taking distribution requirements; and they may feel a greater sense of "freedom" to interact in such classes. They also may be meeting social needs in class to a greater extent than the more advanced students; and they may answer surveys in ways that they perceive will be more pleasing to their teachers, as well as to researchers. In addition, there may be some differences in the ways that teachers approach freshmen/upperclass students and lower level/higher level subjects. Teachers of freshmen, often not the most senior faculty, may be well aware that this is a period of great change and exploration for their students and, therefore, may make extra efforts to encourage their interaction. The nature of some introductory level courses also may provide a wider range of opportunities for interactive approaches.

When findings about techniques that may encourage or discourage participation are analyzed in terms of differences between freshmen/upperclassmen, males/females, the results of this study indicate some varying perceptions. Freshmen appear slightly more sensitive to teaching behaviors than upperclassmen, with five of the nine teaching techniques having a greater effect on encouraging participation among freshman than upperclassmen. Three of the five teaching techniques showing significant differences between freshman and upperclass responses (use of student names, asking for elaboration on questions/answers, and grading for participation) were significant in the direction of being greater encourageres freshmen. Gender differences are especially noteworthy and are fairly consistent across the freshman and upperclass samples, with female students reporting significantly greater encouragement for participation from praise and supportive classroom atmospheres and greater discouragement from criticism and "put downs" for wrong answers. These varying results by different categories of students indicate that teachers, in addition to concerning themselves with specific behaviors that may encourage or discourage student interaction, may need to adjust to accommodate differences among students.

Implications for future research largely stem from the recognition of these differences among students. Instructor behaviors in the classroom, because they are within the control of the individuals who are charged with student learning, will always be important variables in the mix of factors that prompt student interaction. However, other areas to explore in the future include the possible effects of high school experiences and pre-college characteristics; the influence of activities and actions taken by the students themselves; the environmental influences of program format (e.g., class time, class length, class location); the effect of subject

matter and course requirements; and the possible impact of out-of-class contact with students and teachers. The commitment of the academic community to exploring such areas should be sparked by the many studies that find correlations between learning and classroom interaction.

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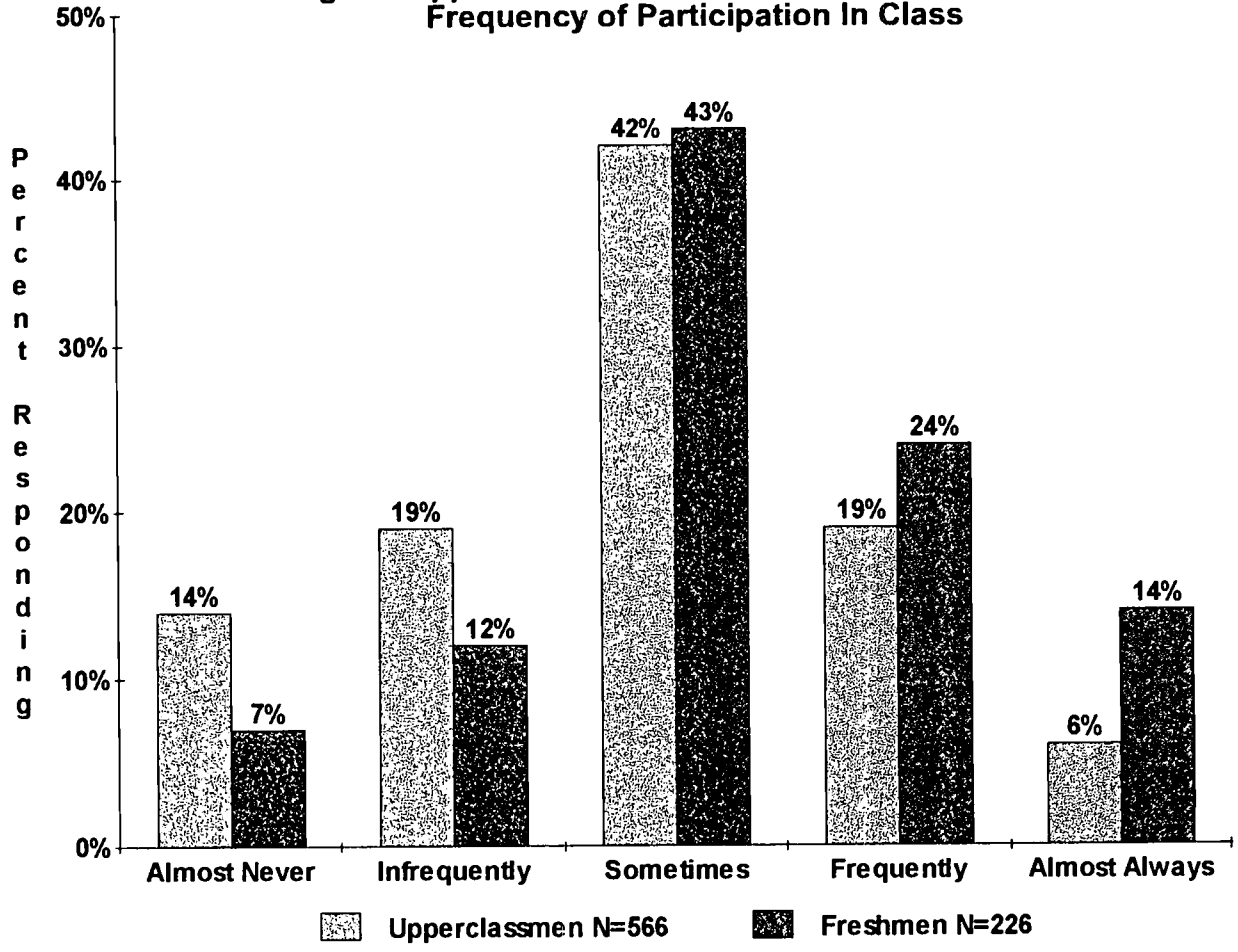
Fig. A: Upperclassmen and Freshmen Compared on Frequency of Participation In Class



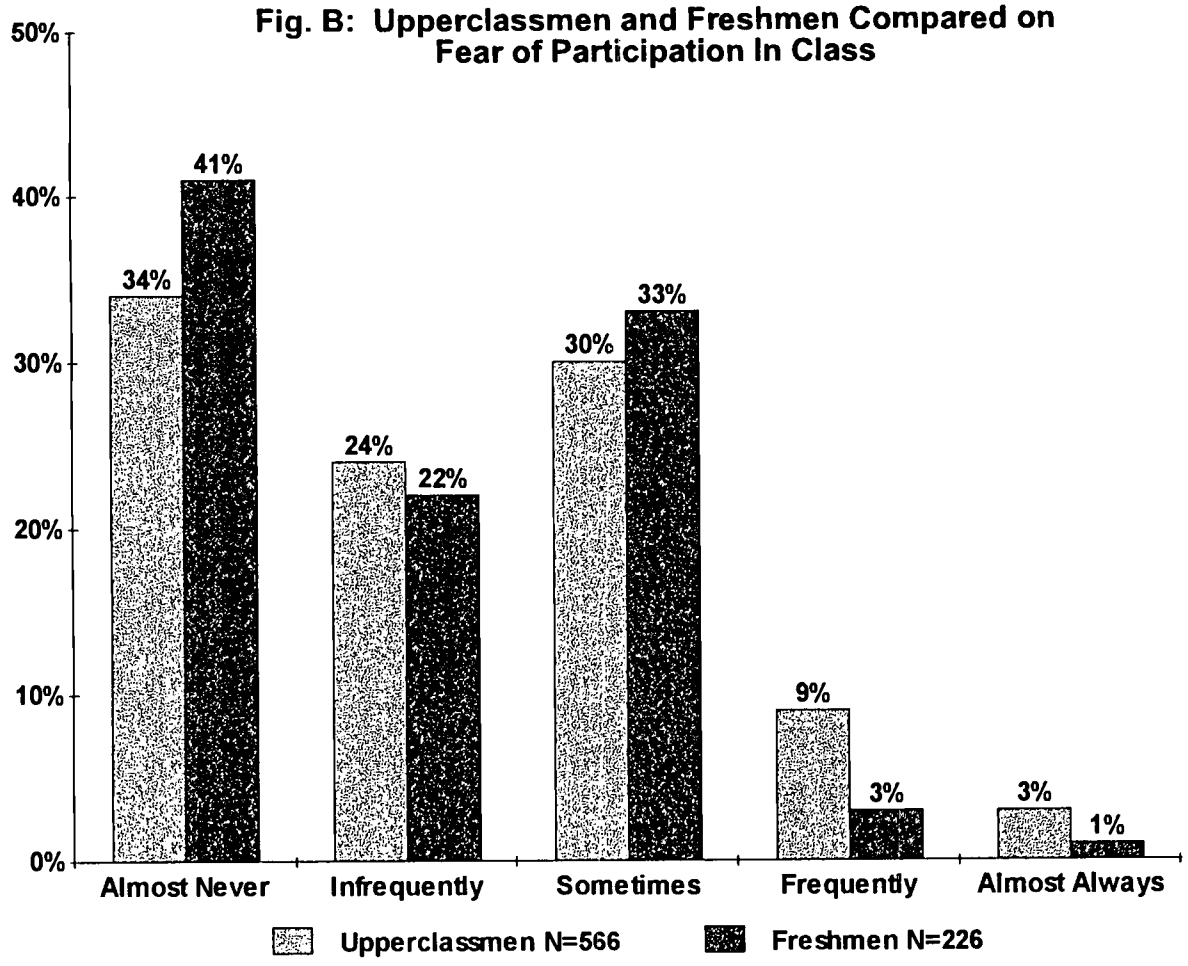


Fig. B: Upperclassmen and Freshmen Compared on Fear of Participation In Class
50%
40%
30%
20%
10%
0%
41%
34%
24%
22%
30%
33%
9%
3%
3%
1%
Almost Never
Infrequently
Sometimes
Frequently
Almost Always
Upperclassmen N=566
Freshmen N=226

TABLE 1

***T*-tests for Freshmen/Upperclassmen Differences on Teaching Technique Questions (N=226 freshmen; 546 upperclassmen)**

Item	Fresh M	SD	U'class M	SD	t
Praise	4.24	0.80	4.36	0.58	-1.99*
Criticism	2.08	1.08	2.06	0.93	0.25
Use of student ideas	4.14	0.70	4.30	0.63	-3.06**
Elaboration	3.65	0.76	3.40	0.83	3.89***
Grades Participation	3.86	0.90	3.50	1.05	4.80***
Use of Humor	4.38	0.66	4.40	0.61	-0.40
Supportive Atmosphere	4.42	0.64	4.38	0.61	0.81
Use of student names	4.14	0.76	3.99	0.83	2.33*
Put downs for wrong answer	1.54	0.92	1.55	0.87	-0.14

NOTE: 1=greatly discourages, 2=discourages, 3=no effect, 4=encourages, 5=greatly encourages. *p<0.05, **p<0.01, ***p<0.001, two-tailed tests

TABLE 2

***T*-test Results for Freshman Survey Items Showing Significant Gender Differences (male N = 106; female N = 120)**

Item name	Male mean	Female mean	t
Praise	4.05	4.39	-3.13**
Supportive atmosphere	4.31	4.51	-2.35*
Criticism	2.35	1.86	3.48***
"Put down" for wrong answer	1.75	1.37	3.02**
Use of humor	4.27	4.47	-2.25*

NOTE: 1=greatly discourages, 2=discourages, 3=no effect, 4=encourages, 5=greatly encourages. *p<0.05, **p<0.01, ***p<0.001, two-tailed tests

TABLE 3

***T*-test Results for Upperclassmen Survey Items Showing Significant Gender Differences (male N = 228; female N = 338)**

Item name	Male mean	Female mean	t
Praise [a]	4.25	4.44	-3.72***
Supportive atmosphere [a]	4.27	4.45	-3.42***
Criticism [a]	2.35	1.86	6.03***
"Put down" for wrong answer [a]	1.69	1.45	3.27***
Participation is worthwhile [b]	3.73	4.00	-3.43***
Feel free to ask questions [b]	4.01	4.36	-4.80***
Tolerates different opinions [b]	3.90	4.17	-3.72***

[a] For these items, 1= greatly discourages participation, 2=discourages; 3=no effect, 4=encourages, 5=greatly encourages. [b] For these items, 1=strongly disagree; 2=disagree. 3=neither agree nor disagree, 4=agree, 5=strongly agree. ***p<.001.

TABLE 4

***T*-tests for Freshmen Teacher/Student Differences on Teaching Technique Questions (N=16 teachers, 226 students)**

Item	Stud. M	SD	Teach. M	SD	t
Praise	4.24	0.80	4.44	0.51	-1.44
Criticism	2.08	1.08	1.75	0.93	1.19
Use of student ideas	4.14	0.70	4.69	0.48	-4.30***
Elaboration	3.65	0.76	4.31	0.60	-3.40***
Grades Participation	3.86	0.90	4.19	0.75	-1.43
Use of Humor	4.38	0.66	4.31	0.70	0.41
Supportive Atmosphere	4.42	0.64	4.31	0.48	0.67
Use of student names	4.14	0.76	4.63	0.62	-2.52*
Put downs for wrong answer	1.54	0.92	1.31	0.48	1.70

NOTE: 1=greatly discourages, 2=discourages, 3=no effect, 4=encourages, 5=greatly encourages. *p<0.05, **p<0.01, ***p<0.001, two-tailed tests

TABLE 5

***T*-test Results for Teacher/Upperclassman Differences on Teaching Technique Questions**

Item	Stud. M	(N)	SD	Teach. M	(N)	SD	t
Praise	4.36	(546)	0.58	4.37	(19)	0.50	0.07
Criticism	2.06	(546)	0.93	2.12	(17)	1.17	0.26
Use of student ideas	4.30	(546)	0.63	4.21	(19)	1.23	-0.30
Elaboration	3.40	(546)	0.83	3.84	(19)	0.69	2.32*
Grades Participation	3.50	(546)	1.05	3.29	(14)	0.83	-0.74
Use of Humor	4.40	(546)	0.61	4.26	(19)	0.56	-0.95
Supportive Atmosphere	4.38	(545)	0.61	4.50	(20)	0.61	0.88
Use of student names	3.99	(545)	0.83	4.20	(20)	0.62	1.14
Put downs for wrong answer	1.55	(545)	0.87	1.21	(19)	0.54	-2.66*

NOTE: 1=greatly discourages, 2=discourages, 3=no effect, 4=encourages, 5=greatly encourages. *$p<0.05$, two-tailed tests.
NOTE: While 20 faculty surveys and 566 student surveys were submitted, incomplete information on some items led to a decrease in the number available for testing.

TABLE 6

Comparing Freshman/Upperclass Students and Faculty on Ideal Amount of Time to Devote to Student Participation

	Answering 0-20%	Answering 21-40%	Answering > 40%
Students			
Freshmen	24%	15%	61%
Upperclass	51%	34%	16%
Faculty			
Freshmen	0%	25%	75%
Upperclass	60%	20%	20%

NOTE: Figures do not total to 100% due to rounding errors.

TABLE 7

***T*-tests for Teacher/Student Differences on Teacher Discussion Climate Questions: Upperclassmen and Freshmen Survey Results**

Item summary	Teach. M	SD	Stud. M	SD	t
FRESHMEN:					
Students feel free to question	4.50	0.63	4.46	0.70	0.22
Teachers tolerate diff. opinions	4.44	0.51	4.25	0.80	1.38
Participation is worthwhile	4.75	0.45	4.24	0.88	3.96***
UPPERCLASSMEN:					
Students feel free to question	4.35	0.59	4.20	0.85	0.78
Teachers tolerate diff. opinions	4.53	0.61	4.04	0.84	2.52*
Participation is worthwhile	4.15	0.93	3.87	0.94	1.34

Note: Respondents were instructed to reply concerning "this class." 1=Strongly disagree; 2=Disagree; 3=Neither agree nor disagree; 4=Agree; 5=Strongly agree.
***$p < 0.001$; *$p < 0.05$, two-tailed test

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