

EFFECTIVE TEACHING METHODS FOR LARGE CLASSES

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Colleges and universities in the United States are experiencing significant growth in student enrollment (U.S. Department of Education, 2005). Concurrently, enrollment in family and consumer sciences-related programs is growing. As a result, family and consumer science educators face the daunting challenge of teaching larger classes while maintaining/improving the quality of instruction and subsequent value delivered to students. This study uses descriptive and inferential statistical techniques to examine the effectiveness of five teaching methods (lecture, lecture/discussion combination, jigsaw, case study, team project) in a large class setting. In addition, student preferences for class size and teaching methods are explored. The findings provide valuable direction for faculty teaching large classes.

According to the U.S. Department of Education's 2005 "Condition of Education" report, undergraduate enrollments in colleges and universities will continue to increase at a steady rate. Class sizes are reaching unprecedented levels. Concurrently, institutions of higher education are pushing faculty to become better teachers and to deliver higher levels of quality and value in the classroom. Delivering quality and value to a large class presents unique challenges. Therefore, it is crucial for faculty to identify viable methods of instruction for large classes.

Purpose

The primary purpose of this exploratory study was to identify effective teaching methods for the large class environment. The research questions guiding the study were "What teaching methods are effective in the large class environments?" and "What are students' perceptions of these methods?" Using student learning outcomes as the criteria for effectiveness, several commonly-used teaching methods (lecture, lecture/discussion combination, jigsaw, case study, team project) were applied and evaluated in a large class setting. In addition, information on student feelings about large versus small classes and student opinions of the teaching methods was gathered. It is hoped that the findings from this study will provide actionable directions for faculty charged with teaching large classes.

Review of the Literature

Managing large classes

Effective management of large classes is a popular topic among faculty in higher education. Carbone (1998) and Stanley & Porter (2002) have produced books focused on the large class environment, offering strategies for course design, student engagement, active learning, and assessment. The advantages of large classes include decreased instructor costs, efficient use of faculty time and talent, availability of resources, and standardization of the learning experience (McLeod, 1998). However, there are significant disadvantages to large classes, including strained impersonal relations between students and the instructor, limited range of teaching methods, discomfort among instructors teaching large classes, and a perception that faculty who teach large classes are of lower status at the institution (McLeod).

Class size and student performance

Extant research on the relationship between class size and student performance has identified conflicting results (Toth & Montagna, 2002). The results of some studies show no significant relationship between class size and student performance (Hancock, 1996; Kennedy & Siegfried, 1997), while other studies favor small class environments (Gibbs, Lucas, & Simonite, 1996; Borden & Burton, 1999; Arias & Walker, 2004). Results vary based on the criteria used to gauge student performance, as well as the class size measure itself. When traditional achievement tests are used, small classes provide no advantage over large classes (Kennedy & Siegfried, 1997). However, if additional performance criteria are used (e.g., long-term retention, problem-solving skills), it appears that small classes hold an advantage (Gibbs et al., 1996; Arias & Walker, 2004).

Effectiveness of teaching methods

The traditional passive view of learning involves situations where material is delivered to students using a lecture-based format. In contrast, a more modern view of learning is constructivism, where students are expected to be active in the learning process by participating in discussion and/or collaborative activities (Fosnot, 1989). Overall, the results of recent studies concerning the effectiveness of teaching methods favor constructivist, active learning methods. The findings of a study by de Caprariis, Barman, & Magee (2001) suggest that lecture leads to the ability to recall facts, but discussion produces higher level comprehension. Further, research on group-oriented discussion methods has shown that team learning and student-led discussions not only produce favorable student performance outcomes, but also foster greater participation, self confidence and leadership ability (Perkins & Saris, 2001; Yoder & Hochevar, 2005).

Hunt, Haidet, Coverdale, and Richards (2003) examined student performance in team learning methods, finding positive learning outcomes as compared to traditional lecture-based methods. In contrast to these findings, a study by Barnes & Blevins (2003) suggests that active, discussion-based methods are inferior to the traditional lecture-based method. A comparison of lecture combined with discussion versus active, cooperative learning methods by Morgan, Whorton, & Gunsalus (2000) demonstrated that the use of the lecture combined with discussion resulted in superior retention of material among students.

Students' preferences for teaching methods

In terms of students' preferences for teaching methods, a study by Qualters (2001) suggests that students do not favor active learning methods because of the in-class time taken by the activities, fear of not covering all of the material in the course, and anxiety about changing from traditional classroom expectations to the active structure. In contrast, research by Casado (2000) examined perceptions across six teaching methods: lecture/discussion, lab work, in-class exercises, guest speakers, applied projects, and oral presentations. Students most preferred the lecture/discussion method. Lab work, oral presentation, and applied projects were also favorably regarded. Hunt et al (2003) also noted favorable student attitudes towards active learning methods.

Methodology

Application of teaching methods

An introductory level retailing class was selected for the study ($N=109$). Specific learning objectives were set forth for each of five chapters, and a different teaching method (lecture,

lecture/discussion combination, jigsaw, case study, team project) was applied for each chapter. For the lecture format, the instructor used PowerPoint slides and delivered in the traditional manner of the lecture style, with no student input/feedback. In the lecture/discussion combination, the instructor used PowerPoint slides to deliver the material, but discussion questions were included on several slides throughout the presentation. The instructor paused and generated student input/discussion several times during the class session using discussion questions. Students discussed and debated issues relevant to the chapter.

The jigsaw method involved grouping the students into teams of four, with each member being given responsibility for reading/learning a portion of the chapter outside of class. Teams were allowed to meet during the next class and deliver their assigned chapter portions to the rest of their team members. Under the case study method, students were assigned a case study to read prior to class time. They were also required to individually prepare written responses to several discussion questions related to the case study. Once in class, students were then organized into groups of four and instructed to share their individual responses to the questions in order to develop a set of “team” responses to showcase the best of all of their individual responses. The team project assignment required teams of four students to develop a profile of a retail firm, with the entire project being completed outside of class.

Assessment of teaching methods

Students were pretested and posttested using objective, multiple-choice questions covering basic terminology and concepts from each chapter in order to assess knowledge of the material before and after each treatment (teaching method) was applied. For example, a learning objective for the first chapter involved defining the term ‘retailing.’ Therefore, on the pretest and posttest, the same multiple-choice question was used to assess the students’ ability to define the term. Then, differences in the pretest and posttest scores were compared to assess improvement under the teaching method being applied in the chapter.

Assessment of the course, preferences for class size, and perceptions of teaching methods

In order to gather information related to students’ assessment of the course, preferences for class size, and perceptions of teaching methods, a survey instrument was developed for the study (see Appendix). The first section of the survey included questions related to students’ overall perceptions of the course using five point Likert-type scales anchored by ‘completely agree’ and ‘completely disagree.’ The next section of the survey required students to answer three questions about each of the five teaching methods examined in the study. For purposes of comparison, the same three questions were asked about each of the five teaching methods. Students were then asked to indicate a single teaching method they thought was the most valuable, and to indicate the one they thought was the least valuable. A space for further explanation of these responses was provided. Next, students were asked about preferences for class size. Background information including gender, class rank, and major was also collected.

Analysis & Results

Sample characteristics

The final sample included 109 students, 82% female and 18% male. In terms of class rank, 8% of the students were seniors, 30% were juniors, 41% were sophomores, and 20% were freshmen. Students represented a variety of academic majors, but the majority of students were majoring in retail merchandising (40%), business administration (33%), and communications

(16%). Fifty percent of the students expected to receive a grade of “B” in the course, while 43% expected an “A.” The remaining 6% expected a “C” as their final grade in the course.

Effectiveness of teaching methods

A repeated measures ANOVA procedure was used to explore differences in the students’ mean scores between the pretests and posttests for each of the teaching methods examined in the study. Significant models were further investigated using multiple comparisons to identify specific differences between the teaching methods. The results of the repeated measures ANOVA omnibus test indicated highly significant differences between the teaching methods ($F=37.54$, $p<.001$) (see Table 1). Multiple comparisons revealed that student performance improved under the lecture method as compared to the lecture/discussion ($p=.010$) and team project methods ($p<.0001$) (see Table 2). In contrast, student improvement under the lecture method was not as positive as under the jigsaw method ($p<.001$). The test for differences between the lecture and case study methods produced non-significant results.

In terms of the lecture/discussion method, significant improvement was seen as compared to the team project method ($p=.004$). However, results indicate that student improvement was stronger under the jigsaw ($p <.0001$) and case study methods ($p <.000$). Performance under the jigsaw method showed significant improvement as compared to the case study and team project methods (both $p <.0001$). The case study method also appeared to be superior to the team project method ($p <.0001$).

Table 1

Repeated Measures ANOVA: Overall Test for Differences between Groups

	Sum of Squares	df	Mean Square	F	Sig.
Difference under teaching methods applied	305.075	4	76.268	37.54	<.001
Total	877.724	432	2.031		

Table 2

Multiple Comparisons

Teaching Method (I)	Teaching Method (J)	Mean Difference (I-J)	F Value	Sig.
Lecture	Lecture/Discussion	0.468	6.83	.010
	Jigsaw	-0.135	46.47	.001
	Case Study	-0.257	1.39	0.24
	Team Project	0.844	16.37	<.0001
Lecture/Discussion	Lecture	-0.468	6.83	0.01
	Jigsaw	-1.817	129.34	<.0001
	Case Study	-0.725	12.68	.000
	Team Project	0.376	4.25	0.04
Jigsaw	Lecture	0.135	46.47	.001
	Lecture/Discussion	1.817	129.34	<.0001
	Case Study	1.092	22.96	<.0001
	Team Project	2.193	112.08	<.0001

Case Study	Lecture	0.257	1.39	0.24
	Lecture/Discussion	0.725	12.68	.000
	Jigsaw	-1.092	22.96	<.0001
	Team Project	1.101	78.44	<.0001
Team Project	Lecture	-0.844	16.37	<.0001
	Lecture/Discussion	-0.376	4.25	0.04
	Jigsaw	-2.193	112.08	<.0001
	Case Study	-1.101	78.44	<.0001

In summary, results of the tests revealed that the students' scores improved between the pretest and posttest for all five of the teaching methods. However, significant differences between the teaching methods were found. Specifically, students' scores improved the most under the jigsaw method. The next largest improvements were under the case study method and the lecture method. The ANOVA tests revealed no significant difference between the case study and lecture methods. Lecture/discussion produced the next largest improvement. The team project method produced the least improvement (see Table 3). For further exploration, analysis of pretest and posttest scores among students of each class rank was undertaken, but produced non-significant results.

Table 3
Improvement from Pretest to Posttest by Teaching Method

Teaching Method	Mean Difference	Std. Dev.	Rank
Jigsaw Posttest – Jigsaw Pretest	2.972	1.487	1
Case Study Posttest – Case Study Pretest	1.880	1.809	2
Lecture Posttest – Lecture Pretest	1.624	1.508	2
Lecture/Discussion Posttest – Lecture/Discussion Pretest	1.156	1.375	3
Team Project Posttest – Team Project Pretest	0.780	1.560	4

Assessment of the course, preferences for class size, and perceptions of teaching methods

Students were asked a series of questions to gather information on their perceptions of the course, as well as their preferences for class size. Eighty-nine percent of respondents indicated that the course had been of value to them. Likewise, 90% of respondents indicated that they had “learned a lot” in the course and 86% rated the topic material as “interesting.” Fifty-one percent of respondents indicated a preference for small class sizes (less than 50 students), while 38% indicated no preference and 10% preferred large class sizes (100 or more students). Ninety-nine percent of respondents reported that they were currently enrolled in other large classes besides this course.

Students were also asked to share their opinion of the most valuable and least valuable teaching method applied. In terms of the most valuable teaching method, the lecture/discussion method was most often selected (38%) (see Table 4). The lecture and jigsaw methods received the next most selections (20% and 19%, respectively), followed by the case study and team project methods (13% and 10%, respectively). Students were also asked why they selected the method as most valuable using an open-ended question (*why?*). The most common reasons for selecting the lecture/discussion method included “forced me to be alert,” “allowed me to contribute and ask questions,” and “not as boring as lectures.”

Jigsaw and lecture were also listed by several students as the least valuable methods (31% and 30%, respectively). The team project (21%) and case study (18%) methods were the next two least valuable methods. Interestingly, no student mentioned the lecture/discussion method as being the least valuable of the teaching methods. As with the most valuable method, students were asked why they selected a method as the least valuable. The most common reasons for selecting the jigsaw method included “people don’t do their fair share,” “don’t enjoy working in groups,” and “difficult to learn from another student.” Common reasons for selecting the lecture method as being the least valuable included “boring,” “doesn’t inspire me to think about the material after class,” and “allows me to sleep in class.”

Table 4
Students’ Preferences for Teaching Methods

	Teaching Method	Frequency	Percent
Most Valuable	Lecture/Discussion	41	38%
	Lecture	22	20%
	Jigsaw	21	19%
	Case Study	14	13%
	Team Project	11	10%
Least Valuable	Jigsaw	34	31%
	Lecture	32	30%
	Team Project	23	21%
	Case Study	19	18%
	Lecture/Discussion	0	0%

Conclusion

Based on the pretest and posttest results, all five of the teaching methods appeared to positively affect students’ grasp of the material. Students’ scores improved most under the jigsaw method, and least under the team project method, whereas the lecture, lecture/discussion, and case study methods produced similar improvement. This finding suggests that moderately-active learning methods such as the jigsaw method are more effective than the lecture, lecture/discussion, and case study methods. However, more extreme active learning methods such as team projects completed outside of class may not be as effective as moderately-active or passive teaching methods.

The findings of this study demonstrate that most students (51%) have a preference for small class sizes (less than 50 students). However, some students (38%) indicated no preference for class size, while the remaining 10% indicated a preference for large classes (100 or more students). Nearly all of the respondents (99%) indicated that they were currently enrolled in other large classes. Therefore, it appears that even though the trade-off between class size and university resources is causing many students to experience large class environments, this is generally not the preference of most students.

The lecture/discussion teaching method was the most preferred among students. Student comments as to their reason for selecting this as the most valuable method seem to suggest that they have a desire to be somewhat active learners, engaging in discussion rather than passively listening to a lecture. The jigsaw method was the most valued by a small percent of the students (19%). This suggests that some students wish to be very active in their learning process, taking sole responsibility for a portion of the material and learning the other portions through

interaction with their classmates. The case study and team project methods were less popular with the students.

Large groups of students found the jigsaw and lecture methods to be the least valuable (31% and 30%, respectively), while some students listed the team project and case study methods. No student indicated that the lecture/discussion method was the least valuable teaching method. This finding suggests that most students enjoy a blend that includes at least some component of active learning/participation in combination with traditional lecture, and confirms the importance of including some level of discussion during the class, but also providing structure through an organized lecture.

Overall, the findings of this study suggest that faculty teaching large classes should attempt to include constructive, active teaching methods in their courses whenever possible. Structured, controlled collaboration (e.g., jigsaw, case study) would probably be most comfortable to students as opposed to uncontrolled, unstructured experiences (i.e., team projects). Results indicate that most students prefer to be active in their learning process. The active and collaborative teaching methods examined in this study are not only desirable to many students, but they also appear to produce significant improvement in terms of learning outcomes.

Future research should investigate the effectiveness of additional active and collaborative teaching methods in the large class environment. Future studies should also incorporate measures of learning outcomes in addition to examination scores. Measuring improvement in higher level comprehension, critical thinking, and problem solving skills could provide more insight into the value of the teaching methods. Based on enrollment projections, large classes are going to become a way of life for most faculty at least during the short term. Therefore, further investigation of large class issues is paramount.

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About the Author

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Appendix (Survey Instrument)

Major: _____

Year in School: Freshman Sophomore Junior Senior

Gender: Male Female

Grade you expect to receive in this course: A B C D F

Please indicate your level of agreement with the following statements by placing an “X” in the appropriate box.

	Completely Disagree	Slightly Disagree	Neither Agree nor Disagree	Slightly Agree	Completely Agree
This has been a valuable course.					
I have learned a lot in this course.					
The topics covered in this course were interesting to me.					
Compared to other college courses I've taken, this course was easier for me.					
Overall, I'd say the assignments and activities in this course have been worthwhile.					

In Chapter 1 of the course, the content was delivered in a pure lecture format (no discussion groups or activities). Please indicate your level of agreement with the following statements about the pure lecture format by placing an “X” in the appropriate box.

	Completely Disagree	Slightly Disagree	Neither Agree nor Disagree	Slightly Agree	Completely Agree
I learned a lot during the pure lecture portion of the course.					
I wish more of the course would have been conducted in the pure lecture format.					
The pure lecture format is the best way for me to learn the material.					

In Chapter 2 of the course, the content was delivered in a lecture/discussion format (formal lecture along with small discussion group sessions). Please indicate your level of agreement with the following statements about the lecture/discussion format by placing an “X” in the appropriate box.

	Completely Disagree	Slightly Disagree	Neither Agree nor Disagree	Slightly Agree	Completely Agree
I learned a lot during the lecture/discussion portion of the course.					
I wish more of the course would have been conducted in the lecture/discussion format.					
The lecture/discussion format is the best way for me to learn the material.					

In Chapter 3 of the course, the content was delivered using a jigsaw strategy (peer-to-peer learning). Please indicate your level of agreement with the following statements about the jigsaw format by placing an “X” in the appropriate box.

	Completely Disagree	Slightly Disagree	Neither Agree nor Disagree	Slightly Agree	Completely Agree
I learned a lot during the jigsaw portion of the course.					
I wish more of the course would have been conducted in the jigsaw format.					
The jigsaw format is the best way for me to learn the material.					

In Chapter 4 of the course, the content was delivered using the case study method. Please indicate your level of agreement with the following statements about the case study format by placing an “X” in the appropriate box.

	Completely Disagree	Slightly Disagree	Neither Agree nor Disagree	Slightly Agree	Completely Agree
I learned a lot during the case study portion of the course.					
I wish more of the course would have been conducted in the case study format.					
The case study format is the best way for me to learn the material.					

In addition to the learning objectives for each chapter in the textbook, this course included several other learning objectives (e.g., learning where to look for industry/company information and learning to cite references APA style). The team project assignment was used to accomplish several of these. Please indicate your level of agreement with the following statements about the team project assignment by placing an “X” in the appropriate box.

	Completely Disagree	Slightly Disagree	Neither Agree nor Disagree	Slightly Agree	Completely Agree
I learned a lot during the team project portion of the course.					
I wish more of the course would have been conducted in the team project format.					
The team project format is the best way for me to learn the material.					

In your opinion, which of the following methods was MOST VALUABLE for you, individually, to accomplish the learning objectives in this course? **(PLEASE CHOOSE ONLY ONE OF THE METHODS LISTED)**

- | | |
|---|---|
| <input type="checkbox"/> Pure lecture (as in Chapter 1) | <input type="checkbox"/> Lecture/Discussion combination (As in Chapter 2) |
| <input type="checkbox"/> Jigsaw method (as in Chapter 3) | <input type="checkbox"/> Case study method (As in Chapter 4) |
| <input type="checkbox"/> Team project method (as in team project) | |

Why?

In your opinion, which of the following methods was LEAST VALUABLE for you, individually, to accomplish the learning objectives in this course? **(PLEASE CHOOSE ONLY ONE OF THE METHODS LISTED)**

- | | |
|---|---|
| <input type="checkbox"/> Pure lecture (as in Chapter 1) | <input type="checkbox"/> Lecture/Discussion combination (As in Chapter 2) |
| <input type="checkbox"/> Jigsaw method (as in Chapter 3) | <input type="checkbox"/> Case study method (As in Chapter 4) |
| <input type="checkbox"/> Team project method (as in team project) | |

Why?

Do you prefer small class sizes (less than 50 students) or larger classes (100 students or more)?

- Small Large No preference

Why?

Are you enrolled in another large class (100 students or more) this semester?

- Yes No