The Effect of Teaching Methods on Examination Performance and Attitudes in an Introductory Financial Accounting Course

JOSEPH MARCHEGGIANI
KAREL A. DAVIS
JAMES F. SANDER
Butler University
Indianapolis, Indiana

ABSTRACT. This article describes a study in which a group-Socratic teaching method and an interactive lecture style were compared for their effect on students' examination performance in an introductory financial accounting course. The effect of teaching method on students' attitudes toward the accounting profession and the course was also analyzed. An ANOVA design was used to test for differences between experimental and control groups of undergraduate students. The results provide no evidence that either method of instruction results in significantly higher scores on examinations; nor was there any statistically significant difference in attitudes toward the accounting profession or the course.

Over the past several years, many diverse groups have called for a change in the manner in which accounting is taught (AAA, 1986). The clamor for change from different quarters exhibits a constant theme: Academics are being asked to deliver a more conceptual approach, develop group problem-solving skills, and establish a base for life-long learning in students (*Perspectives* ... ,1989).

As a result of these appeals, a decision was made to restructure our introductory financial accounting course. Prior to this, we had used what can be loosely described as an "interactive lecture" method. The year after the restructuring was implemented, we conducted a study to examine the effects of the new method versus the old. In this article, we present the results of a study measuring the effects of the new method on student examination performance and attitudes toward accounting.

The redesign of the introductory accounting course was influenced by literature indicating that verbal material *produced* by a learner is remembered better than similar material *presented* to the learner (Jacoby, 1978; McDaniel, Friedman, & Bourne, 1978; Slamecka & Graf, 1978). The course design incorporated this concept, which suggests that an effective course is one fashioned around essential questions that cause a student to search for knowledge. Under this more conceptual approach, the questions and the resulting answers deliver the content of the course (Wiggins, 1987), rather than the instructor simply lecturing to students.

Also, consideration was given to the notion, supported in the literature, that cooperative learning results in greater mastery of a subject than individual learning does (Slavin, 1987; Lindquist, 1995). Most accounting professors are unaware of the benefits of cooperative learning (Cottell & Millis, 1992). The new approach assigned students to groups that would search for answers to questions posed by the instructor. This method will be referred to as the group-Socratic style (a more complete explanation of the group-Socratic approach, along with examples of questions used, is presented in the appendix).

Lindquist (1995) conducted a case study of the effects of cooperative learning techniques on auditing students' attitudes and achievement. His results suggested that student learning improved through the use of such techniques. We investigated the effects of cooperative learning techniques on students in an introductory accounting course.

Friedlan (1995) recently reported the results of a study that investigated the effects of different pedagogical techniques on student attitudes. He used mini cases, with classroom discussions that emphasized critical thinking, and compared these with traditional lecturing. In the current study, we investigated different pedagogical techniques, comparing a group-Socratic approach with interactive lecturing. Friedlan measured the changes in student attitudes only, whereas our study measured the effects on student learning as well as attitudes.

Smith (1987) compared the impact of the traditional lecture and Socratic methods on sociology students' subjective ratings and performance outcomes. Smith indicated that his research was exploratory because "It is difficult . . . to locate evaluations of Socratic vs. other teaching methods, either published or unpublished." In our study, we attempt-

ed to provide empirical evidence of such an evaluation.

Course Redesign

In redesigning the introductory course, the first step was to identify key conceptual areas of accounting principles. As part of this process, we had to accept that all topics currently included in the course are not necessary for students to learn. In fact, covering too many topics can be counterproductive if it distracts students' from the main concepts. Because what students retain is more important than what is covered, we decided to reduce the number of topics covered and emphasize primary accounting concepts as opposed to more procedure-oriented topics. The task was also made easier by avoiding trivial issues and concentrating on significant ones, as suggested by noted authors (Baldwin & Ingram, 1991).

The next task was to generate questions that would require student groups to formulate their own concepts, which we hoped would resemble the accounting concept sought. Guidelines were designed to ensure that the questions would

- go to the core of the concept;
- be kept to a single issue;
- be open-ended;
- not have one obvious "right" answer;
- require analysis, synthesis, and valuative judgment;
- employ Kipling's faithful servants Who, What, Why, Where, When, and How.

To incorporate cooperative learning, the class was divided into small groups (four to six depending on class size). In establishing the groups, an attempt was made to obtain a mix that would reflect GPA, major, class standing, and gender. The following rules were established to govern the group process:

- Each group would have a chairperson, who would be a different student for each class session.
- Each member would be given the opportunity to express an opinion and to rebut other opinions expressed.
- The group would decide on a single answer to the question posed.
- For each question, a different member of the group would report the group answer to the class.
- No member of the group would be permitted to monopolize discussion, interrupt, put down, intimidate, or attack another member.
- Each member would be required to be courteous, respectful, thoughtful, and cooperative and to listen to other members, but this should not prohibit constructive criticism.

In the semester after the group-Socratic technique was introduced in the first course, an interactive lecture approach was used in the second introductory accounting course. Many of the students in the second course had experienced the group-Socratic approach in the first introductory course. Students evaluating the second course were asked to comment on which of the two methods they preferred and why. All but one stated they preferred the group-Socratic approach. Some of the reasons they mentioned to support their preference were "I liked the help I got from my fellow students," "Explaining my thoughts to members of the group helped me see the strengths and weaknesses of my view," "Things just seem to unfold neater," and "I learned more."

The students' comments indicated that the group-Socratic approach developed their appreciation for teamwork, improved their communication and interpersonal skills, and last but not least, provided them with more knowledge of accounting. The students preferred this approach, and that factor alone should lead to enhanced learning. However, there was no hard evidence that any of those benefits were in fact being attained. Therefore, we decided that, in the second presentation of the restructured course, we would collect data to confirm or disprove that the perceived benefits were obtained. In addition to assessing the effect of the two instructional methods on students' learning, we decided to study the impact of the two methods on students' attitudes toward the accounting profession and the course.

Method

Assignment of Students to Groups

Two instructors who were teaching four of the five sections of the introductory financial accounting course participated in the study. Each instructor had more than 12 years of university teaching experience in a variety of accounting courses, including introductory accounting. Both instructors consistently rated above the college average on student evaluations. Enrollment was approximately equal across the four sections, with approximately 40 students in each section. Each instructor taught an experimental group (group-Socratic) and a control group (interactive lecture). The sections were designated experimental or control by the flip of a coin.

According to current university procedures, students were assigned a registration time based on their class standing. Students scheduled a registration appointment during that time on a "first-come, first-served" basis. This registration procedure, combined with the limit on section size, resulted in some students being registered in sections other than the one they initially favored. In our opinion, this procedure resulted in a reasonably random assignment of students to each section, an assumption that was confirmed by tests.

We designed a survey to measure students' attitudes about accounting and the profession by selecting some questions from attitude questionnaires of other authors (Baldwin, 1980; Solomon, 1975). Whereas Friedlan's survey (1995) measured students' perceptions of the importance of various skills for doing well in accounting courses, this study measured students' opinions on whether accounting would be useful in future courses and in their chosen professions, as well as their views of the accounting profession. The attitudinal survey was administrated as a pretest on the first day of class and as a posttest at the final examination. Additional questions regarding the course were also asked at the final examination. The attitudinal questions were answered on a scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

One instructor developed the questions to be used in the group-Socratic (test) sections and the outlines for the interactive lecture (control) sections. Both instructors edited the questions and lecture outlines to ensure that only topics that they both considered central to the subject were included, and to ensure that the content was constant across sections. Throughout the semester, the two instructors collaborated frequently to ensure consistency across methods.

Groups of four to six students, depending on class size, were formed in the experimental sections with a view toward obtaining a diversity of GPA, major, class standing, and gender. All sections used the same text, syllabus, homework problems, and examinations.

A faculty member not currently teaching accounting principles (the "nonteaching faculty member") used the questions and lecture outlines to create all examinations, which consisted of true/false and multiple-choice questions, essays, and problems (the final examination was comprehensive). The teaching instructors did not see the examinations until the date they were given. All sections were examined on the same day at the same time. All examinations were graded blind by the two teaching instructors. The essay questions and problems were randomly assigned to the instructors for grading. For example, all students' responses to problem 1 were graded by instructor *x*. All students' responses to problem 2 were graded by instructor *y*, and so on. Each instructor graded about half the questions from each exam.

Statistical Tests

Differences in student performance were tested with an ANOVA design, through which exam scores were analyzed to determine whether the two primary variables, instructor and method, influenced the dependent variables, student examination performance and attitudes.[1] ANOVA was also used to investigate the differences caused in students' attitudes toward accounting and the profession, as well as the course itself.

Hypotheses

The study was designed to test the following hypotheses:

H_1 There is no significant difference in students' examination performance when compared according to method of instruction.

H_2 There is no significant difference in students' attitude toward the accounting profession when these are compared according to method of instruction.

H_3 There is no significant difference in students' attitudes toward the course when these are compared according to method of instruction.

Results

Student Characteristics

The first step was to determine whether students in each section could be considered "randomly" assigned, even though most were able to choose their section. Accordingly, *t* tests on the means of cumulative grade point averages (GPA) and math SAT (MSAT)[2] scores were performed. In Table 1, we show these results, which indicate surprisingly equal ability levels of students in all four sections. No meaningful differences across instructor or instructional method were noted. Though the *p* value for the MSAT with respect to method was .036 and statistically significant at less than the .05 level, we do not believe that an 11-point difference in SAT scores can be material in predicting academic performance, and therefore viewed the groups as essentially the same in acadmic ability. Therefore, we believe any differences in further results were not attributable to students' academic ability when they began the course.

We also considered that results may be skewed by an unequal distribution of three other factors across sections: major, gender, and class standing. Therefore, we examined the number of students in each section according to these three factors, and found the dispersion was fairly equal across sections. In Tables 2 and 3, we present average examination scores by major, gender, and class standing, as well as the number of students experiencing each instructional method and the *p* value indicating a difference due to method.

With respect to major, 22 accounting majors were in the Socratic sections, and 15 in the lecture sections. There was no statistically significant difference in examination scores compared according to instruction method for accounting majors. Gender differences were also fairly equally distributed across sections. Again, although there were differences between groups, there were no statistical differences between methods for any of the variables shown in Table 2. Class standing, as measured by freshmen/upperclassmen, was fairly equally distributed across sections.

Student Learning

Effect of Pedagogical Method on Students' Examination Performance

The proxy for "student learning" is student performance on four examinations (three examinations and a comprehensive final) given throughout the semester. In Table 4, we show the mean scores in each of the four sections for the four examinations (with number of students taking each examination in parentheses),[3] as well as the average of

TABLE 1. Mean GPA and Math SAT Score, by Instructor and Method

	GPA			MSAT		
Groups	*M*	No. of cases	*p* value	*M*	No. of cases	*p* value
Instructor 0	2.92	77	.512	536	74	.114
Instructor 1	2.94	75		537	72	
Socratic method	2.94	77	.784	542	76	.036
Lecture method	2.92	75		531	70	
Accounting majors	3.04	37	.276	556	35	.141
Non-accounting majors	2.90	115		531	111	

TABLE 2. Mean Examination Score: Major, Gender, and Class Standing by Method

Variable	Socratic	Lecture	*p* value
	Major		
Accounting	80 (22)	77 (15)	.394
Other business	70 (31)	73 (42)	.334
Nonbusiness	76 (23)	70 (15)	.222
	Gender		
Male	70 (36)	72 (38)	.591
Female	79 (39)	76 (33)	.257
	Class standing		
Freshmen	78 (45)	76 (32)	.437
Nonfreshmen	70 (31)	71 (40)	.703

Note. The mean is from all four examinations. The number of cases is in parentheses.

TABLE 3. Mean Examination Score: Major by Class Standing

Variable	Freshmen	Nonfreshmen	*p* value
Accounting	79 (36)	70 (1)	.431
Other business	76 (25)	70 (48)	.066
Nonbusiness	74 (16)	74 (22)	.963

Note. The mean is from all four examinations. The number of cases is in parentheses.

all four examinations. There was very little difference in scores across instructors and/or methods.

In Table 5, we present results of ANOVA tests using the mean[4] of a student's score on all four examinations as the dependent variable. The column headed I presents results for Model I, which examines the primary dependent variables, instructor and method. Model II adds GPA as a covariate to Model I. Model III adds the math SAT score as a covariate to Model I. Model IV adds both covariates to Model I. The data in Table 5 reveal no significant difference, either in instructor or pedagogical method.

Surprisingly, the results indicate no significant difference in students' examination performance, when compared by the pedagogical method used. Though one might argue that examination scores are not the best indicator of learning, they are commonly used and fairly objective (recall that the examinations were written by the nonteaching faculty and were graded blind, with one instructor grading all students for a given question).

The general lack of interaction effects between instructor and method lends reliability to the study in that both instructors apparently produced a similar degree of student learning, as evidenced by examination scores. The absence of a significant difference in student examination performance was contrary to original expectations. The obvious question is, If these two factors do not explain students' performance on exams, what does?

Other Effects on Student Learning

Information gathered on the surveys (and validated by student records) was used to determine variables that might systematically influence students' performance. College entrance examinations and GPA were considered likely candidates. The results for Models II through IV were as expected: GPA and MSAT were both highly correlated with examination scores, whereas method and instructor continued to be insignificant. An interesting point is that GPA was more highly predictive than MSAT because the adjusted *r*-square value for Model II (.581) was much higher than for Model III (.317).

We also tested the effects of other independent variables, namely major, class standing, and gender. Each variable by itself was significant, with method and instructor remaining insignificant. However, in a model including all variables, major, class standing, and gender all became insignificant, with GPA remaining the only significant variable. These results support the notion that, in this study, GPA was the primary explanatory variable for variance in examination performance. The teaching method did not prove to be important in explaining performance. Though we might intuitively believe that a different pedagogy is better than the traditional lecture method, perhaps we should proceed cautiously in our attempts to be innovative, until empirical evidence of real improvements in student learning is produced. Much of the literature advocating new methods of teaching is generally unaccompanied by scientific testing of results. The results of this study indicate that in attempting to bring about change, care should be taken not to "throw the baby out with the bath water."

Student Attitudes

Toward Accounting and the Profession

Although we found no significant differences in student examination performance associated with differences in the method of instruction, we had anecdotal evidence that the difference in method of instruction resulted in a difference in student attitudes. We next examined our data for significant differences in those.

In Table 5, we present the means of the pre- and postsurvey questions for all sections combined, by method and instructor. Post means are presented below the pre means, and *p* values for *t*

TABLE 4. Individual Examinations: Means and Number of Cases

	Method		
	Socratic	Lecture	Instructor
Examination 1			
Instructor 0	80.51 (39)	80.50 (36)	80.51 (75)
Instructor 1	80.56 (36)	79.97 (35)	80.27 (71)
Method mean	80.53 (75)	80.24 (71)	80.39 (146)
Examination 2			
Instructor 0	73.74 (38)	71.40 (35)	72.62 (73)
Instructor 1	77.32 (28)	72.17 (24)	74.94 (52)
Method mean	75.26 (66)	71.71 (59)	73.58 (125)
Examination 3			
Instructor 0	72.97 (38)	70.47 (35)	71.77 (73)
Instructor 1	70.56 (18)	71.29 (21)	70.95 (39)
Method mean	75.26 (56)	71.71 (56)	73.58 (112)
Final examination			
Instructor 0	75.14 (35)	73.52 (33)	74.35 (68)
Instructor 1	72.56 (34)	75.75 (28)	74.00 (62)
Method mean	73.87 (69)	74.54 (61)	74.18 (130)
Average score on all four examinations			
Instructor 0	74.87 (39)	73.45 (36)	74.18 (75)
Instructor 1	74.68 (37)	73.24 (36)	73.97 (73)
Method mean	74.78 (76)	73.34 (72)	74.08 (148)

Note. The number of cases is in parentheses.

TABLE 5. Association of Mean Exam Scores With Pedagogical Method and Instructor: ANOVA Results

	Model number: Significance of F (t for covariates)			
Source of variance	I Instructor by method	II Model I with GPA	III Model I with MSAT	IV Model I with MSAT and GPA
Factors				
Instructor	.928	.625	.876	.794
Method	.511	.075	.496	.126
Interaction of instructor and method	.996	.562	.117	.558
Covariates				
GPA	—	.000	—	.000
MSAT	—	—	.000	.000
Model	.931	.000	.000	.000
Adjusted R^2	.000	.581	.317	.625
No. of cases	148	146	141	140

tests between groups are in parentheses. For example, the mean (on a scale ranging from 1, *strongly disagree*, to 5, *strongly agree*) of the Socratic group for question 1 on the presurvey was 3.36, whereas for the lecture group it was 3.39. The likelihood of these means being statistically different is .84. The items labeled Pre/Post 1 through Pre/Post 11 were presented in the presurvey given the first day of class. The same questions were also asked at the final examination in the postsurvey, along with the items relating to students' attitudes toward the course, labeled C1 through C15. The pre- and posttest questions addressed students' attitudes toward accounting and the profession, whereas the others addressed students' attitudes toward the course and its pedagogical method.

No question on the presurvey yielded significant differences in students' attitudes between either instructors or methods, which again supports the random nature of student assignment to each section. We would not expect a difference in their initial attitudes unless the selection procedures had created a bias. Though some of the students' answers were interesting, none were different based on section type (experimental vs. control), as shown by both t tests and ANOVA (ANOVA results are not presented because they only supported the t tests and showed no interaction effects). No presurvey questions resulted in significant F values; thus, on the first day of class, students exhibited similar attitudes.

Similarly, neither did students perceive much difference at the end of the course due to either instructor or method. There were only one significant (Post 8) and two marginally significant (Post 4 and Post 11) postsurvey questions. An ANOVA was performed on all questions, with method and instructor as factors and the mean score for each question as the dependent variable, which supported the results of t tests, with no interaction effects between method and instructor. The result of Post 8 was fairly interesting, however, because it highlights a difference in student attitudes associated with pedagogical methods. The Socratic-method students disagreed more strongly with the statement "the course made learning too mechanical." This is one of the desired results of the new pedagogy, and one that differs from that reported by Smith (1987). Post 4, which asked how interesting accounting is, showed weakly significant results, with the Socratic-method students disagreeing somewhat less. Post 11 was also weakly significant, suggesting that Socratic students disagreed slightly less that accounting is concerned with trivial matters. We would hope for more significance about this point, but at least both groups *did disagree* that accounting is trivial.

A new variable was formed to investigate the significance of attitudinal changes from the presurvey to the post-

TABLE 6. Means of Attitude Survey Questions

Question	Means				
		Method		Instructor	
	Total	Socratic (p value)	Lecture	0 (p value)	1
Pre/Post 1. The things learned in this course will be useful to me in my professional career after leaving the university. (Baldwin, 1980)	3.37 3.22	3.36 (.84) 3.26 (.59)	3.39 3.18	3.44 (.30) 3.23 (.85)	3.31 3.21
Pre/Post 2. I think AC103 will present an interesting view of business operations and procedures. (Solomon, 1975)	3.03 2.86	3.06 (.61) 2.97 (.16)	3.00 2.73	3.01 (.75) 2.94 (.35)	3.05 2.78
Pre/Post 3. The subject matter that I will learn in this course will assist me in other courses that I plan to take at the university. (Baldwin, 1990)	3.12 2.96	3.05 (.19) 3.06 (.16)	3.20 2.84	3.14 (.75) 3.02 (.44)	3.10 2.89
Pre/Post 4. I think the challenge of working with accounting problems will be interesting. (Solomon, 1975)	2.66 2.25	2.67 (.80) 2.42 (.07)	2.64 2.05	2.72 (.37) 2.45 (.04)	2.60 2.03
Pre/Post 5. I feel that accounting is a rigorous discipline. (Baldwin, 1980)	2.79 3.29	2.76 (.70) 3.28 (.84)	2.81 3.30	2.79 (.91) 3.36 (.25)	2.78 3.21
Pre/Post 6. I hold the accounting profession in high esteem (Baldwin, 1980)	2.75 3.10	2.75 (.99) 3.22 (.14)	2.75 2.96	2.77 (.79) 3.16 (.47)	2.73 3.04
Pre/Post 7. I think AC103 will stimulate my interest in the accounting profession. (Baldwin, 1980)	2.35 2.02	2.23 (.08) 2.12 (.29)	2.48 1.89	2.44 (.20) 2.09 (.45)	2.26 1.93
Pre/Post 8. I think the material in AC103 will be mechanical (Solomon, 1975)	2.53 1.86	2.53 (.99) 1.69 (.01)	2.53 2.05	2.58 (.33) 1.80 (.37)	2.48 1.93
Pre/Post 9. I feel all students should take at least one accounting course to learn about the intricate workings of the financial transactions of ordinary business. (Solomon, 1975)	2.74 2.66	2.80 (.41) 2.71 (.51)	2.68 2.59	2.64 (.21) 2.72 (.48)	2.83 2.59
Pre/Post 10. My impression is that accountants are nothing more than mere "number crunchers." (Solomon, 1975)	1.31 1.02	1.23 (.26) .97 (.49)	1.39 1.09	1.24 (.34) 1.02 (.91)	1.38 1.04
Pre/Post 11. Much of accounting is concerned with trivial matters. (Solomon, 1975)	1.69 1.55	1.61 (.21) 1.38 (.05)	1.77 1.75	1.72 (.57) 1.49 (.51)	1.65 1.61
C 1. AC103 emphasized routine jobs of little challenge.	1.46	1.49 (.73)	1.43	1.55 (.34)	1.37
C 2. In view of the effort I put into it, I feel satisfied with what I learned while taking AC103.	2.58	2.61 (.79)	2.55	2.72 (.14)	2.43
C 3. As a result of having studied some beginning accounting, I am interested in finding out more about the subject matter.	2.33	2.49 (.17)	2.15	2.40 (.60)	2.26
C 4. I found myself just trying to get through the homework problems rather than trying to learn.	1.93	1.78 (.14)	2.11	1.92 (.90)	1.95
C 5. I found the material presented in AC103 to be dry and boring.	1.74	1.71 (.77)	1.77	1.72 (.86)	1.75
C 6. My instructor used teaching methods that enhanced the learning process.	2.61	2.77 (.11)	2.43	3.00 (.00)	2.18
C 7. The examinations were valid representations of the course material.	2.25	2.35 (.34)	2.14	2.44 (.07)	2.05
C 8. As a result of this course, I am less reluctant to express an opinion in class.	1.55	1.57 (.77)	1.52	1.42 (.13)	1.68
C 9. In this course, it was more important to grasp why things are done rather than how they are done.	2.50	2.58 (.39)	2.41	2.49 (.93)	2.51
C 10. In general, the teaching method used in this course generated more thinking than occurs in other courses.	2.57	2.57 (.99)	2.57	2.94 (.00)	2.16
C 11. I found favor with the analytical problem-solving approach.	2.30	2.45 (.06)	2.13	2.45 (.07)	2.14
C 12. In searching for the answers to questions, I discovered that accounting is controversial and there can be many different views.	2.72	2.46 (.01)	3.00	2.82 (.31)	2.62
C 13. I found that AC103 was intellectually stimulating.	2.68	2.72 (.56)	2.63	2.81 (.09)	2.53
C 14. I enjoyed the way this course was presented.	2.25	2.41 (.11)	2.05	2.56 (.00)	1.90
C 15. Overall, I enjoyed this course.	2.31	2.42 (.29)	2.18	2.64 (.00)	1.95

Note. The scale ranges from 1 (*strongly disagree*) to 5 (*strongly agree*). T tests were run on differences in means between each method and each instructor; the p values are shown in parentheses in the Socratic and Instructor 0 columns. (The probability of F values from ANOVA tests are not presented because they are consistent with the results of t tests, with no interaction effects.)

survey. In a paired-difference test, an ANOVA was performed on the *difference* in mean scores. In this paired-difference test, with respect to method, only two questions returned significant F values, indicating a statistically significant change in attitude. The change in attitude exhibited by the Socratic students was significantly different from the change exhibited by the lecture students for pre/post questions 3 and 7. Lecture students thought accounting information would be less useful to them in other courses than they did at the beginning of the semester, whereas

Socratic students' scores remained constant (p value = .007). Also, whereas the Socratic group's interest in the accounting profession declined slightly, the lecture group's fell much more (p value = .031). There were no significant changes related to the instructor factor.

The Course

Very little difference was detected in students' attitudes toward the course as a result of either method or instructor. Four questions resulted in significant differences due to instructor (C6, C10, C14, C15), whereas only one was significant for method (C12), as can be seen in Table 6. Interestingly, Socratic students disagreed more with the statement ". . . accounting is controversial and there can be many different views" than did lecture students. Though this may at first glance appear disheartening, perhaps Socratic students, as a result of constant questioning and searching for answers, became more comfortable with less specificity and vagueness in general and thus perceived controversy less negatively than did their lecture counterparts.

Summary, Limitations, and Conclusions

Overall, we found very little difference in introductory accounting students' examination performance, or in their attitudes, based on instructional technique. Though this conclusion is contrary to current thinking about the benefits of pedagogical changes recently advocated, several factors might have contributed to the results. Perhaps certain subject matters lend themselves well to the Socratic approach, whereas other subjects, accounting principles for example, are equally suited to either the Socratic or interactive lecture methods.

This study is subject to bias that might be created by self-selection or characteristics of students such as class standing, gender, or major. However, we believe we have demonstrated that the effects of those on the results are minimal and therefore do not contribute to the lack of differences between pedagogical methods.

One factor out of our control is the drop rate of each section, in particular, whether students tended to drop the class *because* of the instructional method. Though we could not directly test this notion, the drop rate was fairly similar for each section. A comparison of the number of students who took the first exam versus the number who took the final revealed that 7 and 9 students dropped from each instructor's classes, and 6 and 10 dropped from each method.

A somewhat tangential question relates to the nature of the examinations and their ability to determine the extent of student learning. If one of the major advantages of the Socratic method is to develop and enhance higher order thinking skills, then examinations must *assess* higher order thinking skills. However, as Mayer-Sommer (1990) pointed out, there is insufficient research into the testing of higher order thinking skills. If the exams did not test higher order thinking skills, that would explain the lack of significance in students' performance. In other words, perhaps students subjected to the Socratic method *did* in fact develop better higher order thinking skills, but our examinations and/or testing procedures simply were not precise enough to detect such a difference.

The scant difference between methods may also have been caused by the equalization of content between test and control sections. Both instructors acknowledge that, in developing the Socratic method, they eliminated much procedural material that previously would have been covered in the lecture method. They became much more focused on fundamental concepts in the lecture method, and both felt tha they were more efficient and effective in delivering the material in the lecture sections. Thus, decreased attention was paid to more procedure-oriented matters by the instructors in both the experimental and control sections; the emphasis in all four sections was on fundamental concepts. We suggest that the lesson to be learned here is that less content and more depth concerning major concepts results in enhanced student learning, a notion long advocated by the Accounting Education Change Commission and other learning experts. In fact, in accounting courses, perhaps student learning is not as sensitive to delivery methods as to the content being delivered.

An interesting side note is that both instructors designated their first section of the day as Socratic, with the second section being Lecture (by the flip of a coin). They both taught their two sections back-to-back. Though we thought the coin flip would result in random designation, it might have backfired: Because both instructors taught Socratic first, they both may have been susceptible to a "wash-over" effect resulting in improved examination performance in the lecture sections *because* of the use of the Socratic method. This wash-over effect would make differences in methods even more difficult to discern.

Differences in students' attitudes are difficult to measure, one primary reason being that the attitude is self-reported. Students had no special incentive to be thoughtful in these answers, and though the respondents were anonymous to the instructors, students might not have believed that they were. Whether they reported what they honestly felt, or what they thought we wanted to hear, or whether they simply raced through the survey are obvious questions that are difficult to resolve.

Further work is needed to validate expected improvements resulting from suggested pedagogical changes. In addition, research is needed to develop reliable methods of testing higher order thinking skills, which may be the decisive factor. However, until we know more about pedagogical methods and their effects on student learning through empirical research, we should be wary of blindly following our intuitive sense and leaping headlong into new methods without adequate support.

NOTES

1. Regression analysis was not used because the primary independent variables are categorical in nature.

2. Tests were performed on math SAT, verbal SAT, and combined SAT. The results were virtually the same, so we only included the math SAT in the results presented.

3. One might notice the decrease in the number of students sitting for Examinations 2 and 3 in sections taught by Instructor 1. This was because students were told that if they missed an examination for any reason, no make-up would be given but the final would absorb the weight of the missed examination. Because students in all sec-

tions took the examination at the same time, we wanted to avoid the problem of having to make up more than one examination and incurring the risk of testing different ideas in different ways. The effect that fewer students had on examination scores is unclear, but because scores were remarkably even across sections, irrespective of the unequal cell sizes, we assumed that there was little or at least an unbiased effect on the significance of the independent variable.

4. ANOVA was also performed on the four individual examination scores, with very similar results. For brevity's sake, we only report results for the average of all four examinations.

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APPENDIX

SUMMARY OF THE SOCRATIC METHOD

The Socratic method is organized around key questions, the answers to which develop the content of the course. It is designed to engender thinking. In searching for answers, the students experience the controversial nature of the subject and the fact that there are different views. This approach causes students, rather than the professor, to be the main performers, a role they enjoy.

For example, to learn the importance of comparability and consistency, students might be asked, "Should each company be permitted to develop its own rules and practices of measuring and communicating its financial information, and why?" After discussion, most groups report that if each company developed its rules, the information reported by one entity could not be compared with that of another and the information would be less useful.

When an item is a little more difficult to discover, we first ask a question that can be answered intuitively, and the facts can be readily associated with the facts in a follow-up question. For example, students find it difficult to grasp what the closing process achieves. Thus, we ask them, "Assume cab fares are a dollar a mile and you need to go two miles. A cab pulls up, a passenger gets out and you get in. The meter has $8 on it. You tell the cab driver where you want to go. He drives the two miles and the meter has $10.00 on it. Would you pay the $10.00? How much should you pay? What could the cab driver have done so that the meter would reflect the amount you should pay?" The groups quickly state that they should pay $2.00 and that the cab driver should have reset the meter to zero. The follow-up question is, "Assume a business started on 1/1/X1. At 12/31/X1 the revenue and expense accounts have a balance that reflects the revenues earned and the expenses incurred during 19X1. If you do nothing and then record the revenue earned and expenses incurred in 19X2, would the balances in the accounts at 12/31/X2 be correct? If not, what can you do so that the balances would be the proper amount?" They will quickly discover that, like the meter on the cab, the accounts will contain inflated amounts. Also, as in the meter case, they will discover that the solution lies in resetting the revenue and expense accounts to zero.

This technique changes the teacher's role; it does not diminish it. The role now is to design questions that challenge the students' intellectual capacity and require them to become more sophisticated thinkers. As students respond to questions, the instructor determines whether or not they are performing well (i.e., are they analyzing, synthesizing, and making sound judgmental decisions?). If they are not, it is the lecturer's function to give them feedback as to how to improve their thinking process.