THE ACCOUNTING EDUCATORS' JOURNAL
Volume XVIII
2008
pp. 103 -117

The Effects of PowerPoint Lecture Notes on Student Performance and Attitudes

Hossein Nouri
The College of New Jersey

Abdus Shahid
The College of New Jersey

Abstract

This paper explores whether providing lecture notes when PowerPoint is used for class presentation affects student performance and attitudes toward instructor. This study was conducted in a classroom setting throughout the semester. The experiment involves two sections of an Accounting Principles II course. The results show that students who did not receive PowerPoint lecture notes indicated that the instructor was more effective and efficient than students who received PowerPoint lecture notes. No differences were found between the two groups in evaluating the instructor on such attributes as *preparedness, caring about students,* and *feedback*. The results further indicate that providing lecture notes did not appear to affect students' performance on the exams. Moreover, students' responses to the PowerPoint presentation questions indicated that there were no differences between the section with lecture notes and the section without the lecture notes on such attributes as *understandability*, *dullness*, *entertainment*, and *learning effect* of the PowerPoint presentation.

Keywords: PowerPoint; lecture notes; performance; attitudes; learning effect.

Introduction

PowerPoint was created in 1987 for preparing business slides but later became influential as an educational tool. At the same time, it became the most complained about piece of software during the past two decades (Gomes, 2007). Proponents of PowerPoint argue that the application increases visual quality in the learning process. They also contend that it takes less time to present a subject matter; therefore, more materials can be covered in the classroom. Opponents of PowerPoint believe that it diminishes creativity and innovation as well as it "elevates format over content, betraying an attitude of commercialism that turns everything into a sales pitch (Tufte, 2003)."

In recent years, the use of PowerPoint in the classroom has significantly increased globally (Connor & Wong , 2004; Bartsch & Cobern, 2003). Prior studies of multimedia have shown that the use of different presentation media (multimedia versus traditional) does not affect students' recall of information in accounting courses (Butler & Mautz, 1996; Nouri & Shahid, 2005). With regard to students' attitudes toward class presentation and instructor in Accounting Systems class, Butler and Mautz (1996), using a laboratory experiment, report that subjects in the multimedia session perceived better *understandability* and *entertainment* from class presentation. Subjects also evaluated the instructor higher with respect to informativeness and style of the speaker. Nouri and Shahid (2005), using a semester long study, report that students in a PowerPoint section of an Accounting Principles II class perceived higher *understandability* of the presented materials. They report no significant differences on

entertainment between the PowerPoint and traditional sections of the course. With regard to students' attitudes toward the instructor, Nouri and Shahid (2005) report that students in the PowerPoint section perceived the instructor was more prepared than did students in the traditional section. They further find no significant differences on the students' attitudes toward the instructor on measures of informativeness, effectiveness, time efficiencies, and overall performance.

The above studies examined how students' performance and attitudes are affected when multimedia is used in classroom presentation. The results of prior accounting studies, in general, indicate that while multimedia may not affect the students' recall of information, it could affect students' attitudes toward the class presentation and instructor (e.g., Butler & Mautz 1996; Nouri & Shahid, 2005). This study extends prior research in this area by examining whether providing notes when PowerPoint is used has any effect on student performance and attitudes. The results show that students who did not receive PowerPoint lecture notes indicated that the instructor was more effective and efficient than students who received PowerPoint lecture notes.

Theory and Hypotheses

While several studies have examined the effects of PowerPoint on student learning and attitudes (e.g., Nowaczk et al. 1998; McInnes et al. 1995; Bulter & Mautz 1996; Nouri & Shahid, 2005), no known study has investigated the effect of providing notes when PowerPoint is used on students learning and attitudes. Exceptions to this are studies that have recommended the use of PowerPoint lecture notes in the learning process. For example, Coursey (2003) provides several suggestions including "use the notes pages" to enhance PowerPoint presentations in the classroom. Finkelstein (2005) discusses how and when PowerPoint notes should be used in the classroom. Young (2004) reports that when professors provide their PowerPoint slides before the class, attendance suffers. To overcome these deficiencies, some professors produce "riddles with blank and missing information," which should be filled in during the lecture (Young, 2004).

We posed the question of how PowerPoint notes are used in accounting courses through the Accounting Education using Computers & Multimedia (AECM) listserve. Out of 16 responses, nine professors stated they provide lecture notes before the class with students printing PowerPoint slides three in a page with note lines. Three professors said they provide solutions after the class for a short period of time. Two professors stated they give lecture notes after the class. One professor provided slides with answers, and the other professor, slides without answers, both after the class. Since most professors seem to use lecture notes before the class with students printing three slides in a page with note lines, this study adopts this procedure for further investigation.

According to Intelligence Inc website under The Principle of Recitation (http://web-us.com/memory/memory_and_related_learning_prin.htm):

> There is no principle that is more important or more effective than *recitation* for transferring material from the short-term memory to the long-term memory. For one thing, you are obviously in the process of **repeating** the information. Recitation can take several forms -- thinking about it, writing it out, or saying it out loud. "Thinking about it" is potentially the least effective because it gives us the least amount of reinforcement since writing or speaking involve more electrical muscle movement messages to the brain which are known to increase mental response and recording.

This study argues that writing the notes in class rather than providing them to students before the class can have a positive effect on student attitudes and performance. This is also consistent with the literature regarding active versus passive learning. Active learning refers to situations where students are involved in the educational process instead of passively listening to lectures (Hermanson, 1994). Providing PowerPoint lecture notes before the class causes students to become passive learners and do not get involved in class activities. On the other hand, not providing notes when PowerPoint is used, students write a lecture out that makes them more involved learners through repetition. Brown (2004) contends that active learning processes that promote *writing* affect deep

understanding. Bouris et al. (1998) note that passive learning leads to more behavioral problems than active learning. Although a few studies have found that active learning did not affect performance and student satisfaction compared to passive learning (e.g., Wingfield & Black, 2005), a large body of psychology literature shows that active learning affects student performance, teacher effectiveness, student satisfaction, student attitudes toward learning, and perceived educational quality (e.g., Dickinson & O'Connell, 1990; Maher, 1981; MacGregor et al. 2000; Nerenz & Knop, 1982; Poppenhagen et al., 1982).
The preceding arguments suggest that in a class without PowerPoint lecture notes, students are very much active and involved in the class by taking notes. According to the involvement theory advanced by Astin (1984, p. 297), "student involvement refers to the amount of physical and psychological energy that the student devotes to the academic experience." The involvement theory focuses on the student's active participation in the learning processes e.g., spending more time on task. Furthermore, involvement theory views education as a partnership between the student and the instructor where students are active participants. The involvement theory suggests that the instructors focus less on what they do and more on what a student does. Astin (1984, p304) states "Being academically involved is strongly related to satisfaction with all aspects of college life except friendship with other students."

Since taking notes requires students' involvement, they may perceive that the instructor is both efficient and effective. On the other hand, when notes are provided, students sit and watch the presentation passively and are not involved in class. As this pattern continues during the semester, students may become passive learners. Students in the section with PowerPoint lecture notes, therefore, may view the class as monotonic and are likely to say that the instructor did not use class time efficiently and/or effectively. Since involvement enhances satisfaction, as suggested by Astin (1984), students in the PowerPoint class without lecture notes are more likely to say that the instructor was well-organized, well-prepared, effective, efficient, understandable, and receptive to their questions and concerns.

In summary, students taking lecture notes (active learners) may perform better than students who receive lecture notes (passive learners). In addition, note taking and students' involvement may positively affect perceptions of an instructor's attributes. For example, providing PowerPoint lecture notes prior to the class could affect such attributes as an instructor's preparedness, efficiency, effectiveness, understandability, etc. The above discussion leads to the following hypotheses, stated in alternative form:

Hypothesis 1
Students who do not receive PowerPoint lecture notes prior to class will perform better in the course than students who receive PowerPoint lecture notes prior to the class.

Hypothesis 2
Students who do not receive PowerPoint lecture notes prior to class will evaluate the instructor more favorably than students who receive PowerPoint lecture notes prior to the class.

Research Methodology

The research used an experimental design, which included a control group without random assignment (Shavelson 1988). The field experiment involved two sections of an Accounting Principles II course. The two sections met twice a week and each session lasted 80 minutes. The first section, with 35 students, was used as the control group. The second section, with 27 students, was used as the treatment group. In the control group section, PowerPoint was used without the notes, while in the treatment group section, PowerPoint was used with the PowerPoint notes (three slides on one page with note lines) before the start of the lecture. The first section was scheduled before the second section on the same day to ensure that students in the control group did not have an opportunity of receiving the PowerPoint notes of the same topics from the students in the treatment group. The presentation for both sections was supported by multimedia, with a majority of the presentations being PowerPoint (color visual aids with

pictures). The same instructor taught both sections of the course. The instructor also used cooperative learning, problem-based learning, and case methods to promote active learning (see http://www.crlt.umich.edu/tstrategies/tsal.html, June 11, 2008).

Both lecture and problems were presented through PowerPoint. However, problem solutions were not given in the notes; only the frameworks of the solutions without numbers were included in the notes. If the PowerPoint lecture presentation included a question, the answer to the question was deleted from the notes in order to increase students' participation in the class. In both sections, PowerPoint was used without notes before the first midterm exam, which took place three weeks after the start of the semester. This was done to control for subjects' intellectual ability and prior knowledge of the course. The instructor has used the same textbook for several years. In addition, the instructor created his own PowerPoint presentation for this textbook. Therefore, there was no learning effect on the part of the instructor that could affect students' performance and attitudes.

We examined two issues before testing the study's hypotheses. First, we checked whether the manipulation was successful. Therefore, we examined whether the perceived writing requirements were different between the two sections. Second, students in the two sections should have similar attitudes toward PowerPoint presentation. Otherwise, any possible differences in hypotheses could be due to such attitudes rather than note-taking. Therefore, before testing the hypotheses, it is necessary to examine whether (1) manipulation effect had actually worked, and (2) students in the two sections had similar attitudes toward PowerPoint presentation.

To investigate these two issues, a questionnaire (Appendix A), similar to those employed by Butler and Mautz (1996) and Nouri and Shahid (2005) was administered at the end of the semester at the time of class evaluation to measure students' attitudes toward PowerPoint presentation. The instructor provided the rationale for the anonymous questionnaire and asked a student to collect the questionnaires and submit them with the class evaluation to the office of the dean. This procedure assured students that the instructor could not see the questionnaire until after the grades for the course were submitted to the dean's office. In this questionnaire, subjects anonymously evaluated the PowerPoint presentation on different characteristics (Oppenheim et al., 1981; Butler & Mautz 1996; Nouri & Shahid, 2005). Subjects rated 16 PowerPoint attributes on a 7-point Likert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree). Forty-nine questionnaires were completed by students, twenty-five by students in the PowerPoint section without notes (control group) and twenty-four by students in the PowerPoint section with notes (treatment group). Two questionnaires from the PowerPoint section with notes were deleted from analyses because one student used only the extreme values and the second students used the middle value for all items.

Manipulation Effect

To check for manipulation effect, one of the 16 items dealt with the writing requirement of PowerPoint Presentation. The mean response of students in the control section (no PowerPoint notes) on the statement "The PowerPoint presentations required extensive note-taking" was 5.93 (SD=1.03) compared to the treatment section (with PowerPoint notes) that had a mean response of 1.86 (SD=1.04). The difference in two means was statistically significant ($t=11.78$, $p<0.001$). These results indicate that students in the control section perceived there were more writing requirements than students in the treatment section.

Attitude toward PowerPoint Presentation

Factor analysis was used to identify factors underlying the remaining 15-item student attitudes toward PowerPoint presentation. Initial principal factor analysis revealed four factors with Eigen values greater than 1.0, which accounted for 71.5% of the observed variation in attitudes. This was followed by a VARIMAX rotation to facilitate interpretation of the underlying factors. The four factors were named *understandability*, d*ullness*, *entertainment*, and l*earning effect* of PowerPoint presentation. The four factors had reliability coefficients of 0.86, 0.76, 0.85, and 0.71, respectively. The results of the factor loadings are presented in Table 1.

The responses to the variables loaded on each of the four factors were added together, after correcting for the reverse items, to form the factor. The mean responses for each factor were then compared for the two groups. Table 2 reports the means and two-sample t-test for each of the factors.

The results indicate no significant differences between the two sections on students' attitudes toward PowerPoint presentation (i.e., understandability, dullness, entertainment, and learning effect). These results suggest that any potential differences in testing hypotheses could be due to the manipulation effect rather than PowerPoint presentation.

Variables Measurement

Performance measurement: Four objective (multiple choices) exams were administered during the semester and the scores on these exams were used to measure performance. The first exam had 20% of the course grade and was used to control for the intellectual ability of the students. The three remaining exams each had 20% of the course grade and consisted of both concept questions and exercises/problems. Different versions of the exams were used with answers scrambled without any specific order. Since being present in the class presentation was a necessary condition for the study, the exam results of six students from the control section and four students from the treatment section were deleted from analyses because they had more than five absences during the semester (i.e., they missed three weeks of the semester). Therefore, the final sample was 29 for the control group and 23 for the treatment group.

Attitude toward the Instructor: The college class evaluation questionnaire was used to measure students' attitudes toward the instructor. This is a 15-item questionnaire (Appendix B), in which students evaluate the instructor on different attributes with the first question asking students to indicate why they are taking the course (i.e., general education, elective, etc.). Item 15 asks students' overall evaluation of the instructor on a 5-point Likert-type scale ranging from poor to excellent. The remaining 13 attributes are evaluated on a 5-point Likert-type scale ranging from strongly disagrees to strongly agree, with another column allowing students to check "not applicable" if necessary. The college requires that the questionnaire be administered during the last two classes. The instructor leaves the classroom during the evaluation and one student collects the questionnaire, seals the envelope, signs the sealing, and submits it to the office of the dean. The instructor can receive the evaluations after the grades are submitted to the Dean's office. The items on this questionnaire were used as the dependent variables of the study. Students completed 49 class evaluations.

Independent Variable: The independent variable was the two course delivery systems: PowerPoint without lecture notes and PowerPoint with lecture notes. As mentioned earlier, in the first section of the course, presentations were made through PowerPoint, but no lecture notes were given. The second section used PowerPoint, but at the start of each chapter, PowerPoint lecture notes (three slides per page with note lines) were given to the students.

Results

The study's hypotheses deal with students' performance as well as students' attitudes toward the course instructor.

Performance Effect

Hypothesis 1 examines if there is a difference in performance between the control and treatment group. Scores on the four exams were used to measure performance of the students. An analysis of covariance was conducted with

exam scores as the dependent variable, scores for the first midterm exam as a covariate[1], and treatment as the independent variable to test whether student performance was different between the two sections. The results are presented in Table 3.

The results show that there are no significant differences on students' exam performance between the two sections. These findings do not provide support for the first hypothesis. But these results further indicate that any significant difference in testing hypothesis 2 could be due to the manipulation effect rather than attribution based on students' performance on exams. That is, if providing PowerPoint lecture notes affect students' performance and recall of information, then students may evaluate the instructor differently in two sections and, as such, any difference in hypothesis 2 could have been attributed to students' performance.

Student Attitudes toward Instructor

Two sample t-tests were used to test hypothesis 2. Since the college uses individual items of the questionnaire for tenure and promotion decision, Table 4 presents the results of t-tests for each individual item.

The results indicate that there are some differences between the two sections in students' attitudes toward the instructor. Since the students in the control group are more involved and active than those in the treatment group, hypothesis 2 predicts that students in the control group will evaluate the instructor more favorably. Consistent with hypothesis 2, students in the PowerPoint section without lecture notes (active learning) evaluated the instructor higher on such attributes as receptiveness to student concerns (item 2), efficiency (item 3), understandability (item 10), and effectiveness (item 14) than students in the PowerPoint section with lecture notes (passive learning).

The results, however, indicate there is no difference between control and treatment groups for other attributes. It is reasonable that some of the insignificant attributes may not be related to students' satisfaction. For example, providing PowerPoint lecture notes to the class should have no effect on instructor's attributes: meeting classes regularly, providing consultation and advice, and grading and returning work timely. Therefore, the results show that students who did not receive notes prior to a lecture perceived the instructor the same as students who received notes prior to the lecture on such attributes as preparedness (item 4), consultation and advisement (item 5), meeting classes regularly (item 6), course assignments (items 7), feedback (item 9), cheating discouragement (item 11), and cultural values (item 12).

Conclusions and Limitations

This study examines whether providing lecture notes when PowerPoint is used for class presentation affects students' performance and attitudes toward instructor. The findings of the study show the following results. First, providing lecture notes did not appear to affect students' performance on the exams. Second, students' responses to the PowerPoint presentation questions indicated that there were no differences between the section with lecture notes and the section without the lecture notes on such attributes as understandability, dullness, entertainment, and learning effect of the PowerPoint presentation. Third, with regard to the evaluation of the instructor, students who did not receive PowerPoint lecture notes indicated that the instructor was more effective and efficient than students who received PowerPoint lecture notes. No differences were found between the two groups in evaluating the instructor on such attributes as preparedness, caring about students, and feedback.

The findings of this study also contribute to our understanding of how providing PowerPoint lecture notes can affect an instructor's class evaluation. This is important because colleges and universities use such class evaluations for

[1] Subjects' grades for Accounting Principles I, their overall GPA before the start of the semester, and their grades for the first midterm exam were used to control for subjects' intellectual abilities to recall materials. Since these grades were highly correlated [Correlation of 0.53 between grades in Accounting Principles I and overall GPA ($p<.001$), 0.41 between grades in Accounting Principles I and first midterm exam ($p<.01$), and 0.53 between overall GPA and grade in the first midterm exam ($p<.001$)], only students' grades for the first midterm exam were used in this study as a covariate.

tenure and promotion decisions. The results suggest that students who receive PowerPoint lecture notes perceive the instructor is less receptive to student concerns, does not use the class time efficiently, and is less effective in teaching.

This study represents an initial step in assessing students' reactions to providing PowerPoint lecture notes prior to the lecture. As such, it is subject to a number of limitations. The results may not apply to other courses where the students are significantly different from those in this study. The average student in this study had an SAT score of 1,200 and ranked in the top ten percent of their high school class.

Another limitation of the study is the way presentations were made in each section. In the section with the lecture notes, more time was available for other class activities. To keep the two sections similar to each other as much as possible, the extra time was used to explain the materials with more examples. This may have contributed to the results of the study, in particular student performance. It should be noted that although students in the treatment group (PowerPoint with lecture notes) evaluated the instructor less effective and efficient, students might have evaluated higher the instructor's effectiveness and efficiency in teaching of the extra class time created by providing PowerPoint lecture notes was used to incorporate other activities into the class (such as group problem solving).

Despite these limitations, the findings of this study should be of interest to instructors who use PowerPoint and multimedia in their delivery of instructional materials. The results of this study suggest that under *ceteris paribus* conditions, students who receive PowerPoint lecture notes before the start of a lecture may evaluate the instructor lower on his or her time efficiency, teaching effectiveness, and responsiveness to student needs and concerns. Since such students' evaluations are used for tenure and promotion decisions, these results may assist instructors to carefully plan their delivery of the instructional materials.

Further research is needed to examine whether this study's results are specific to a certain population of students or it is generalizable to other populations. In addition, it should be investigated if other activities are included in the class in which PowerPoint lecture notes are given prior to the lecture, they will affect students' attitudes toward the instructor.

REFERENCES

Astin, A.W. 1984. Student Involvement: A Development Theory for Higher Education. *Journal of College Student Personnel* (July 1984), 297-308.

Bartsch, R. A., and K. M. Cobern. 2003. Effectiveness of PowerPoint presentation in lectures. Computer & Education 41:77-86.

Bouris, R., H. Creel, and B. Stortz. 1998. *Improving student motivation in secondary mathematics by the use of cooperative learning*. Master's Action Research Project, Saint Xavier University aand IRI/Skylight.

Brown, K. 2004. Technology: Building interaction. *Tech Trends: Linking Research and Practice to Improve Learning*, 48(5): 36-38.

Butler, J. B., & Mautz, Jr, R. D. 1996. Multimedia presentations and learning: A laboratory experiment. *Issues in Accounting Education*, 11(2), 259-280.

Connor, M., and Irene F. H. Wong. 2004. Working through PowerPoint: A Global prism for local reflections. *Business Communication Quarterly* 67(2): 228-231.

Coursey, D. 2003. What's wrong with PowerPoint and how to fix it. http://review.zdnet.com/4520-7296_16-4208143.html.

Dickinson, D., and D. O'Connell. 1990. Effect of Quality and Quantity of Study on Student Grades. *Journal of Educational Research*, (March/April 1990): 227-231.

Finkelstein, E. 2005. Creative techniques: PowerPoint principles for education. *Presentations*, 19(9): 14-15.

Gomes, L., 2007. PowerPoint turns 20, as its creators ponder a dark side to success. *The Wall Street Journal*, June 20; page B1.

Hermanson, D.R. 1994. The effect of self-generated elaboration on students' recall of tax and accounting material: Future evidence. *Issues in Accounting Education*, 9(2): 301-318

Intelligence Inc. The Principle of Recitation, http://webus.com/memory/memory_and_related_learning_prin.htm.

MacGregor, J., J.L. Cooper, K.A. Smith, and P. Robinson. 2000. *Strategies for Energizing Large Classes: From Small Groups to Learning Communities.* San Francisco: Jessey-Bass Publishers.

Maher, C.1981. Training of Managers in Program Planning and Evaluation: Comparison of Two Approaches. *Journal of Organizational Behavior Management* (Spring 1981): 45-56.

McInnes, W. M., Pyper, D., Van Der Meer, R., & Wilson, R. A.1995. Computer-aided learning in accounting: educational and managerial perspectives. *Accounting Education*, 4(4), 319-334.

Nerenz, A., and C. Knop. 1982. A Time-Based Approach to the Study of Teacher Effectiveness. *Modern Language Journal* (Fall 1982): 243-254.

Nouri, H., and A. Shahid . 2005. *The effect of PowerPoint presentations on student learning and attitudes. Global Perspectives on Accounting Education, 2: 53-57.*

Nowaczyk, R. H., Santos, L. T., & Patron, C.1998. Student perception of multimedia in the undergraduate classroom. *International Journal of Instructional Media*, 25(4) 367-383.

Poppenhagen, B., E. Schuttenberg, and J. Gallagher. 1982. Active Learning for Post Secondary Educators: A Study of Two Learning Designs. *Alternative Higher Education* (Summer 1982): 242-257.

Oppenheim, L., Kydd, C., & Carroll, V. P. 1981. A study on the effects of the use of overhead transparencies on business meetings. Working paper, Wharton Applied Research Center of the University of Pennsylvania.

Shavelson, R.J. 1988. *Statistical Reasoning for the Behavioral Sciences*. New York, NY: Allyn &Becon.

Tufte, E. 2003. PowerPoint is evil. http://www.wired.com/wired/archive/11.09/ppt2.html.

Wingfield, S.S., and G.S. Black. 2005. Active versus passive course design: the impact on student outcomes. *Journal of Education for Business*, 81(2): 119-125.

Young, J.R. 2004. When good technology means bad teaching. *The Chronicle of Higher Education*, (November 12).

Table 1

Factor Loadings of PowerPoint Presentation Attitudes

Variable	Factor 1 Understandability	Factor 2 Dullness	Factor 3 Entertainment	Factor 4 Learning Effect
Strong	***0.71***	0.26	0.11	0.30
Concise	***0.60***	0.24	0.16	-0.05
Easy to follow	***0.77***	0.15	0.18	0.23
Professional	***0.80***	0.12	0.34	0.02
Clear	***0.81***	0.27	0.13	0.14
Boring	-0.12	***-0.84***	-0.31	-0.02
Stimulated thinking	0.25	***0.55***	0.11	0.49
Tiresome	-0.34	***0.77***	-0.08	-0.10
Enjoyable	0.41	0.33	***0.68***	0.15
Entertaining	0.14	0.04	***0.90***	0.15
Interesting	0.31	0.45	***0.69***	0.18
Helpful in learning	0.48	0.32	0.31	***0.66***
Challenged me to think	-0.08	0.09	0.09	***0.87***
Could not allow enough class participation	-0.51	0.16	-0.07	-0.53
Resulted in class time efficiency	0.46	0.15	0.31	0.48

Table 2

Two sample t-Tests for PowerPoint Presentation Factors

	Mean (std dev)			P-value
Factor	**Without Notes**	**With Notes**	**t-Statistic**	**(2-tailed)**
Factor1: Understandability	29.00 (5.058)	29.45 (3.687)	-0.35	0.730
Factor 2: Dullness	11.44 (3.501)	11.27 (4.222)	0.15	0.883
Factor 3: Entertainment	12.24 (3.609)	12.59 (4.079)	-0.31	0.756
Factor 4: Learning Effect	10.44 (2.083)	9.86 (3.044)	0.77	0.448

Table 3

Summary of Analysis of Covariance

Independent Variable	Exam 2				Exam 3				Final exam			
	F	df	F	P	SS	df	F	P	SS	Df	F	P
First Midterm Exam	2779.57	1	22.06	.000	1968.79	1	20.47	.000	1472.66	1	14.00	.000
Treatment	52.04	1	0.41	.524	44.24	1	0.46	.501	139.06	1	1.32	.256
Error	5922.95	47			4711.94	49			5048.77	48		
Model R-Square	0.32				0.30				0.25			

Note: All reported SS are the SS adjusted for the covariates.

Least Square Cell Means

Independent Variable	Exam 2	Exam 3	Final exam
PowerPoint without lecture notes	71.702	72.207	73.698
PowerPoint with lecture notes	69.654	70.348	77.020
P-value	0.524	0.501	0.256

Note: P-value tests the null hypothesis that the least square mean for PowerPoint section without lecture notes is equal to the least square mean for PowerPoint section with lecture notes.

Table 4
Two sample t-Tests for Instructor Attributes

Variable	Mean (Std dev)		t-Statistic	P-value[a]
	Without Notes	With Notes		
1. The instructor presents material in a well-organized fashion.	4.536 (0.881)	4.381 (0.865)	0.61	0.27
2. The instructor is receptive and responsive to student needs, questions, and concerns.	4.179 (0.772)	3.714 (1.056)	1.78	0.04
3. The instructor uses class time efficiently.	4.643 (0.489)	4.143 (0.963)	2.18*	0.02
4. The instructor is well prepared for each class.	4.714 (0.460)	4.524 (0.814)	0.96*	0.15
5. The instructor is accessible for course-related consultation and advice.	4.000 (0.938)	3.905 (0.831)	0.36	0.36
6. The instructor regularly meets his or her classes.	4.857 (0.356)	4.857 (0.478)	0.00	0.50
7. The instructor assigns course work that is challenging and helps me learn.	3.964 (1.036)	3.905 (1.091)	0.20	0.42
8. The instructor grades and returns student work in a timely fashion.	4.179 (0.723)	4.095 (1.044)	0.33	0.37
9. The instructor provides me with meaningful feedback on my work.	3.500 (0.962)	3.211 (0.631)	1.25*	0.11
10. The instructor presents course material in a manner that helps me understand the subject matter.	4.036 (1.071)	3.500 (1.147)	1.66	0.05
11. The instructor discourages dishonesty and cheating.	4.269 (0.778)	4.191 (0.928)	0.32	0.37
12. The instructor respects individual differences and cultural backgrounds.	4.192 (1.021)	4.211 (1.032)	-0.06	0.47
13. The instructor challenges me to think.	3.893 (1.031)	3.857 (0.854)	0.13	0.45
14. Overall, I would rate the instructor's teaching effectiveness in this course as…	4.071 (0.813)	3.667 (0.913)	1.64	0.05

*t-test is based on unequal variances.
[a] One-tail test

APPENDIX-A

Please check the section you are attending:

Accounting Principles II-Section 01 _____
Accounting Principles II-Section 02 _____

Please answer the following questions:

Your Sex is: Male: _____ Female: _____

Your Overall GPA by the end of the last semester was: _____

Your grade for accounting principles I was: _____

Direction: Please circle the number that most accurately describes your attitudes toward the following statements. Use the following scale as a reference for your response to questions 1 and 9.

1=Strongly disagree **2=Moderately disagree** **3=Slightly disagree**
4=Neither disagree nor agree
5=Slightly agree **6=Moderately agree** **7=Strongly agree**

1. The PowerPoint presentations:

	Strongly Disagree						**Strongly Agree**
Were strong……..	1	2	3	4	5	6	7
Were enjoyable…….	1	2	3	4	5	6	7
Were boring……..	1	2	3	4	5	6	7
Were concise…….	1	2	3	4	5	6	7
Were entertaining…..…….	1	2	3	4	5	6	7
Were easy to follow……..	1	2	3	4	5	6	7
Were professional…….	1	2	3	4	5	6	7
Were clear…….	1	2	3	4	5	6	7
Stimulated thinking……	1	2	3	4	5	6	7
Were interesting……	1	2	3	4	5	6	7
Were tiresome……...	1	2	3	4	5	6	7
Could not allow enough class participation……..	1	2	3	4	5	6	7
Required extensive note-taking……	1	2	3	4	5	6	7
Resulted in using the class time efficiently……..	1	2	3	4	5	6	7
Were presented in a manner that helped me learn…	1	2	3	4	5	6	7
Challenged me to think…….	1	2	3	4	5	6	7

APPENDIX-B

Anonymous Student Feedback on Teaching

	UNDERGRADUATE				GRADUATE	
	a general education course	an under-graduate elective	a specific requirement in my under-graduate major/minor	an option in my under-graduate major/minor	a requirement in my gradu-ate program	as an elective in my gradu-ate program
1. I am taking this course as: (select only one)	①	②	③	④	⑤	⑥

	Strongly Agree		Neither Agree Nor Disagree		Strongly Disagree	Not Applicable
2. The instructor presents material in a well-organized fashion.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	○
3. The instructor is receptive and responsive to student needs, questions, and concerns.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	○
4. The instructor uses class time efficiently.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	○
5. The instructor is well prepared for each class.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	○
6. The instructor is accessible for course-related consultation and advice.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	○
7. The instructor regularly meets his or her classes.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	○
8. The instructor assigns course work that is challenging and helps me learn.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	○
9. The instructor grades and returns student work in a timely fashion.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	○
10. The instructor provides me with meaningful feedback on my work.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	○
11. The instructor presents course material in a manner that helps me understand the subject matter.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	○
12. The instructor discourages dishonesty and cheating.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	○
13. The instructor respects individual differences and cultural backgrounds.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	○
14. The instructor challenges me to think.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	○

	Excellent	Very Good	Satis-factory	Less Than Satis-factory	Poor
15. Overall, I would rate the instructor's teaching effectiveness in this course as:	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ

Mark Reflex® by NCS EM-215898-2:15141312 ED06 Printed in U.S.A.