

# Open Vs. Closed Notes: Effect on CIS Exam Results

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## Abstract

*This paper summarizes findings of teaching eight sections of the same college course in the same style with one exception. Section 1, 3, 4, 5 and 8 had notes available for reference during the final exam whereas Sections 2, 6 and 7 did not. The author's hypothesis that students in the 5 sections using notes would perform significantly better than the other sections on the exam was disproved.*

## INTRODUCTION

Students often ask about use of reference aids during exams in most disciplines. These aids are most commonly notes they have taken, textbooks, handouts, or perhaps access to information stored on computers and/or the Internet. Although this practice may be common, the author was unable to locate any directly relevant research.

## METHODOLOGY

Two hypotheses were formulated:

H0: Use of reference notes will significantly improve performance of students on an exam.

H1: Use of reference notes will not significantly improve performance of students on an exam.

To test these hypotheses the professor proceeded to teach eight sections of the same course at the same university in the same way with the exception that Sections 1, 3, 4, 5 and 8 were allowed to use reference notes during the final exam whereas Sections 2, 6 and 7 were not.

The subjects

Subjects were enrolled in eight sections of a computer information systems (CIS) course within the business school at a mid-sized state university in the USA. The full professor who taught all sections holds a Ph.D. in business with an emphasis in information systems and also holds professional certifications.

Sections 1, 5 and 6 met 3 times a week for 70 minutes per session during the day. Section 3, 7, and 9 met two times per week for 110 minutes per session in the afternoon. Sections 2 and 4 both met two times per week for 110 minutes in the evening.

All students in the eight sections had the same reading assignments, the same two exams and the same five sets of homework, comprised of using spreadsheet, data base, internet, PowerPoint and diagramming software. Students were expected to participate in class and the majority did.

Students enrolled in the day sections (1, 3, 5, 6, 7, and 8) were slightly younger than those in Sections 2 and 4 and tended to be full time students. Section 2 and 4 students mostly worked full time during the day and were enrolled in one or two evening classes.

More females than males were enrolled in all eight sections with the highest percentage of females being enrolled in the Section 8, an afternoon class. Section 5 students attended class most regularly (83%) and Section 2 students attended class least often (69%). Accurate roll records were not maintained for sections 7 and 8, but the instructor believes attendance was somewhere between sections 2 and 5. The demographic profile of students is summarized in Table 1.

#### The exams

All students took the same midterm and final exam. Both exams were comprised of 80 questions. All questions were multiple choice and had four items to choose from. Questions were based on a combination of lecture and reading assignments. The instructor made sure the material tested was covered in lectures and could be found in reading assignments as well. Students had at least 100 minutes to complete the final exam. They took approximately 12 minutes longer on average when using notes. Exams were machine scored.

No section was allowed the use of notes during the midterm. Five of the eight sections were allowed use of one page (8 ½ by 11 inches) of handwritten notes for the final exam. Sections 2, 6 and 7 were not allowed to use any notes.

**TABLE 1**  
**DEMOGRAPHICS**

DEMOGRAPHIC ITEM	SECTION 1	SECTION 2	SECTION 3	SECTION 4	SECTION 5	SECTION 6	SECTION 7	SECTION 8
NO. OF STUDENTS TAKING FINAL EXAM	33	28	35	28	44	34	35	31
TIME OF MEETING	Day	Evening	Day	Evening	Day	Day	Day	Day
FREQUENCY OF MEETINGS	3 days per week	2 evenings per week	2 days per week	2 evenings per week	3 days per week	3 days per week	2 days per week	2 days per week
STUDENT MAJOR	Business Administration, wide range of options	Business Administration, wide range of options	Business Administration, wide range of options	Business Administration, wide range of options	Business Administration, wide range of options	Business Administration-wide range of options	Business Administration –wide range of options	Business Administration – wide range of options
PORTION OF TIME WORKING	Most part time	Most full time	Most part time	Most full time	Most part time	Most part time	Most part time	Most part time
RELATIVE AGE	Younger	Older	Younger	Older	Younger	Younger	Younger	Younger
GENDER DISTRIBUTION	68.8% female	62.1% female	55.6% female	71.4% female	56.8% female	61.8% female	72.3%	74.2%
ATTENDANCE: portion of class meetings attended	74.4%	69.3%	77.7%	75.0%	83%	76.6%	N/A	N/A

## FINDINGS AND ANALYSIS

Table 2 summarizes by section the averages of scores on exams and the number of students taking the exams. Interestingly, seven of the eight sections had higher average scores on the final exam than on the midterm. Section 7 did not use notes but was extremely consistent to achieve the same average score for both the midterm and final exams. Although sections 2 and 6 did not use notes, they showed substantial improvement. Sections 1 and 3 showed the least amount of improvement even though they were both allowed to use notes. Thus the results provide mild support for the null hypothesis.

**TABLE 2**

**SUMMARY OF EXAM RESULTS FOR CIS 3060 COMPUTER INFORMATION SYSTEMS IN MANAGEMENT**

	MIDTERM # STUDENTS	MIDTERM AVERAGE SCORE Of 80 QUESTIONS	FINAL EXAM # STUDENTS	FINAL EXAM AVERAGE SCORE of 80 QUESTIONS	CHANGE IN SCORE
SECTION 1	33	50	33	<b>52.27</b>	+2.27
SECTION 2	32	55	28	60.25	+5.25
SECTION 3	35	58.43	35	<b>61.37</b>	+2.94
SECTION 4	29	57.62	29	<b>61.18</b>	+3.56
SECTION 5	43	53.6	44	<b>59.2</b>	+5.6
SECTION 6	36	50.9	34	55.7	+4.8
SECTION 7	35	53.69	35	53.69	0
SECTION 8	33	51.94	31	<b>56.13</b>	+4.19
AVG ALL SEC.	34.50	53.90	33.63	57.47	+3.58

Possible explanations:

-Since use of notes is optional, many students may choose not to use them and thus negate the potential impact.

-Allowing notes may instill a false sense of confidence such that students do not prepare thoroughly for the exam.

-Limiting reference notes to one page may be too similar to allowing no reference notes.

-The final exam may be inherently easier than the midterm.

-The instructor may have been more proficient in teaching sections 2 and 4 in the evening after having rehearsed in sections 1 and 3. (One must note, however, that section 5, a day class, showed the greatest improvement on the final.)

-This may have been an anomaly. Three sections as the control group may be insufficient.

## **CONCLUSION**

There was insignificant evidence to support the primary hypothesis that use of notes on CIS exams enhances student performance.

In the virtual classroom of the future, research such as this will be more challenging to conduct because of the difficulty in controlling reference materials available to students during exams. Exams as we know them today may cease to exist!

## **POSSIBILITIES FOR FUTURE RESEARCH**

Several possibilities exist for additional research on ways to improve student performance on exams:

-A larger population of students taking several courses with different instructors should be tested to verify results.

-Since use of notes was optional, the performance of students who choose to use notes should be compared with performance of those not using notes.

-Other variables worthy of study include student demographics (portion male/female, etc.), attendance, time of day the class meets, and internet-based vs. face-to-face sections.

## **REFERENCES**

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