A pilot study examining the effects of time constraints on student performance in accounting classes

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ABSTRACT

The purpose of this study was to examine the effects, if any, of time constraints on the success of accounting students completing exams. This study examined how time allowed to take exams affected the grades on examinations in three different accounting classes. Two were sophomore classes and one was a senior accounting class. This limited pilot study consisted of a sample size of 80 students at one university covering one semester. Very little research has been conducted on the effects of time allowed for exams and student performance on exams. Students in this pilot study were given the same exam twice. First, they were allowed four minutes to complete the exam and then they were allowed 15 minutes to complete the same exam. Although students scored higher on the second exam in which they were given more time, the explanatory variables did not explain much of the variation between students.

Keywords: Time constraints, student performance, accounting students, exams

INTRODUCTION

Accounting educators are always interested in factors that might affect students' success in accounting classes. Previous research has examined many factors that might affect such success. These include GPA, race, scheduled time of classes, students' expectations, etc. This paper reports the results of a study which examined the effects of time allocated to students to complete an exam on student success in taking the exam. Accounting educators generally agree that no matter how long students are given to complete an exam a few students will take the full time allocated to take the exam. This is a good strategy? On one hand, students may sit there long enough and the answer to a problem will finally come to them. On the other hand, many professors, including the authors, have a few students come back and say that they initially had the right answer and later went back and changed it to a wrong answer.

REVIEW OF THE LITERATURE

As stated earlier, much research has been conducted examining factors affecting students' success in accounting classes. These include the timing of classes (Morris et al 2014; Vruwink et al 1987), students' GPA (Hicks et al 1984; Turner et al 1997; Eikner et al 2001) gender of students (Carpenter et al 1993; Lipe 1989) and class size (Laughlin, 1976; Mary, 1998; Murdoch, 2002).

Early research examining the effects of time constraints placed on students and their success in taking examinations was limited. These early studies (Bridgeman, 1980; Evans et al 1972; Wright 1984) generally concluded that increasing the time students were allowed to complete exams did not have a significant effect on their exam grades.

One study (Onwuegbuzie 1995) examined the effects of time constraints on students taking a statistics class. In this study 13 students were given an examination and told they had 90 minutes to complete the exam. In another class 13 students were given the exact exam and told they had unlimited time to complete their exams. Under normal conditions, students were given 90 minutes to complete the exam. The results indicated that students given unlimited time to complete the exam earned a significantly higher score than those students given a time limit.

A more recent indirectly related study (Hosch 2010) examined the effects of time spent by students taking standardized entrance/exit exams at a university. The study covered a three year period. The results indicated that for both the entrance exam (freshmen) and the exit exam (seniors), students who spent more time on the exam had significantly higher scores.

HYPOTHESIS DEVELOPMENT

The purpose of this pilot study was to examine the effects of time constraints on student performance in accounting classes as measured by exam grades. Based in part on a review of the literature and the authors' own classroom observations it was believed that additional time allowed students would not significantly improve their grades. This led to the following hypothesis:

H1: Students taking accounting exams will not earn a significantly higher grade on exams when allowed more time to complete the exam.

METHODOLOGY

The sample size consisted of 80 students in three undergraduate accounting classes. All classes were taught at the same university. Students who volunteered to take part in this study were told extra points would be awarded to them based upon the higher of their two grades on these quizzes. In this study students were given the same quiz twice. It was believed by the authors that giving the same quiz would avoid the issue of one quiz possibly being more difficult than the other thus increasing the validity of the study. The quiz consisted of 6 multiple choice questions. The questions only covered topics that students had discussed in the current accounting class or in a previous accounting class. In the first quiz students were allowed 4 minutes to answer the questions. At the end of the 4 minutes the quizzes were taken up. The second quiz (same as the first quiz) was then passed out to students and they were allowed 15 minutes to complete the quiz. This measured the impact of the extra time on the students' performance. The quiz and the instructions provided to students can be found in the appendix.

ANALYSIS

The sample consisted of 80 students from three accounting classes. The average grade when students were allowed four minutes to take the quiz was 1.75 correct answers out of 6 possible correct. This was a grade of 29%, which is only a slight improvement over random chance. Random chance would give a grade of 25% on multiple choice questions with four alternatives.

The average grade when students were allowed a total of fifteen minutes to take the quiz was 3.93 correct answers out of 6 possible correct answers, an improvement of 1.19 correct answers (19.8 percentage points). A pairwise t-test was performed, obtaining a test statistic of 9.34 with a critical t of 1.99 (α=.05, two tailed test) for the hypothesis that the two sample means were drawn from the same population. Since the sample t exceeds the critical t, the null hypothesis that the two samples were drawn from the same population was rejected. That is, it was concluded that allowing the eleven minutes extra time on the quiz significantly improved the students' scores.

The authors also investigated whether the improvements in quiz score varied by the course that the quiz was conducted in or by the sex of the student taking the quiz. A multiple regression was performed on the dummy variables COURSE and SEX in order to test these effects. The independent variable was IMPROVE, which was equal to the difference between each student's score when allowed fifteen minutes to take the quiz and that student's score when allowed four minutes to take the quiz. The results are contained below in Table 1.

R-squared shows that the regression model only captured about 2.8% of the variation in student improvement. It is likely that individual student characteristics other than sex explain more of the variation in improvement. The low F statistics shows that we cannot reject the null hypothesis that the coefficients of both explanatory variables are simultaneously zero. That is, the overall relationship between improvement and the two explanatory variables is weak. The

prob. values of both explanatory variables exceed the .05 level of significance, indicating that the coefficients of both variables are not significantly different than zero.

In summary, though the extra time significantly and substantively improved student performance by nearly 20%, our explanatory variables do not explain much of the variation between students.

RESULTS

The results did not support the hypothesis that extra time does not improve student performance. The pairwise t-test showed that the differences between scores were unlikely due to random variation as indicated in table 1 (appendix 1). However, the differences between individual students' improvements could not be explained. There was no significant difference in the results between the sophomore accounting classes and the senior accounting class and no significant difference due to student sex.

LIMITATIONS

All empirical research has inherent limitations. This study gave the same quiz twice. It should be made clear that the researchers view the experimental technique as taking a snapshot of student performance at a four minute mark and taking a snapshot at a 19 minute mark. A valid criticism would be the issue of how the finality of the break between the two performances might have influenced the result. This study had a sample size of 80 students from three undergraduate accounting classes. All students attended the same university. Future research might include a larger sample size with students from several universities. A more accurate measure might be obtained by giving the same questions in both quizzes but with different numbers.

CONCLUSIONS

This pilot study examined the effects of time constraints on the performance of accounting students taking a quiz in undergraduate accounting classes. Little, if any, research has been conducted in this area in recent years. The results provide evidence to accounting instructors that allowing students more time to take accounting quizzes/exams improves their grades.

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APPENDIX 1

Table 1
(t-statistics in parentheses)

Variable	Coefficient	Prob value
INTERCEPT	**1.04 (5.232)**	**.000**
COURSE (Senior=1)	**0.386 (1.478)**	**.142**
SEX (Male=1)	**-0.041 (-0.161)**	**.873**
R-square	**.028**	
F Test	**1.102**	**.337**

APPENDIX 2

Instructions to Students and the Quiz

Purpose of This Study

The purpose of this study is to examine how time allowed students to take an exam affects their performance on that exam. Students will be told in advance that their participation in this study is completely voluntary and they may leave the classroom if they wish not to participate. They will be told that if they choose not to participate in this study it will not have any negative effect on their grade in this class or any other class. Students will be asked to take the same quiz twice and given different times to complete the quizzes. They will not be told that the second quiz will be the same as the first. In taking the quiz the first time they will be allowed only 4 minutes. The second time they take the quiz they will be allowed 15 minutes. A comparison of the results will be made. The students will be told in advance that no student names or schools names will ever be identified any way in the publication of this study.

Instructions to Students

Thank you for your voluntary participation in this study. If you have decided not to take part in this study you may leave the classroom at this time. You will first be asked to take a short quiz on various accounting topics. This quiz will be timed. You will be told in advance how much time you will have to complete the first quiz. After the quizzes have been taken up, you will be asked to take a second quiz on various accounting topics which will also be timed. Again you will be told in advance how much time you will have to complete the second quiz. The class results of these quizzes will be used in a research study and will be published sometime in the future. Please be assured that no individual names or schools will identified in any way in the publication of this study. You will earn 1 point for each correct answer on the higher of your two exam grades.

The Quiz

Instructions: Please write the correct answer on your scantron.

1. Information for John Traylor Co. is as follows:

Direct Materials Used	$50,000
Direct Labor	40,000
Factory Overhead	25,000
Cost of Goods Sold	55,000
Beg. Work in Process	32,000

End. Work in Process 10,000
Sales Salaries 7,000

How much is the Cost of Goods Manufactured?

a. $127,000 c. $156,000
b. $137,000 d. $142,000

2. A machine was purchased by Jim Dear Co. on January 1, 2014 for $51,000. The estimated life was 5 years and the estimated residual value was $9,000. Using double-declining balance depreciation the depreciation expense for the year 2016 is:

a. $12,403 c. $10,419.
b. $4,555 d. $7,344.

3. Paul Torres Co. uses the allowance method to account for bad debts. Torres estimates that 3% of net sales will be bad debts. On January 1, 2013 the Allowance for Doubtful Accounts had a credit balance of $3,000. During 2013, the company wrote-off accounts receivable totaling $3,500 and had credit sales of
$200,000. There were no sales returns or allowances during the year. The beginning balance in accounts receivable was $75,000. The ending balance in accounts receivable was $55,000. After the adjusting entry, the balance in the allowance account on December 31, 2013 will be:

a. $5,000. credit c. $500. debit
b. $5,500. credit d. $3,000. debit

4. Paul Torres Co. uses the allowance method to account for bad debts. Torres estimates that 3% of net sales will be bad debts. On January 1, 2013 the Allowance for Doubtful Accounts had a credit balance of $3,000. During 2013, the company wrote-off accounts receivable totaling $3,500 and had credit sales of $200,000. There were no sales returns or allowances during the year. The beginning balance in accounts receivable was $72,000. The ending balance in accounts receivable was $90,000.The bad debts expense for the year ended December 31, 2013 will be:

a. $5,500. c. $6,000.
b. $500. d. $3,500.

5. On January 1, 2015 Jim Rutland Co. issues 10%, 10 year bonds with a face value of $400,000. The bonds were sold for 98. The bond interest is paid semiannually on June 30 and December 31. Rutland amortizes the bond discount using the straight-line method. The interest expense for the year ended December 31, 2018 will be:

a. $40,800. c. $39,200.
b. $40,000. d. $48,200.

6. Randall Perry Co. had the following inventory data for March:

March 1 Inventory	30 units @ $10.
5 Sold	10 units
12 Purchased	40 units @ $12.00
23 Sold	25 units
30 Purchased	5 units @ $13.00

Using a perpetual inventory system, how much was the cost of goods sold for March if the company uses FIFO?

a. $485 c. $225.
b. $395 d. $360