

# The Impact Of A Simulation Exercise In The Intermediate Financial Accounting Course

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## ABSTRACT

*This paper presents the results of a simulation exercise included in the intermediate financial accounting course and discusses its impact on college-level students. The objectives of this study are to assess the impact of using a simulation exercise to improve students' mastery of cash flow reports, as well as to assess their ability to synthesize data and draw conclusions about the liquidity and solvency of a company. Students who were required to perform analysis prior to taking the exam did better overall on generating a cash flow statement as well as evaluating both the liquidity and solvency of a company.*

## INTRODUCTION

The delivery of quality education is important to all college educators. Educators must also be concerned with preparing students to meet the challenges of a constantly changing environment. This is particularly evident for business educators and more specifically, accounting professors. The accounting profession has indicated the skills required for the 21<sup>st</sup> century accountant must include critical thinking skills. While there are many ways to assess the effectiveness of programs to develop critical thinking skills in college accounting curriculums, success rates on the CPA examination will be a key performance measure. Beginning in 2004, the CPA examination has not only changed to a computerized format, but it has moved from a test of facts to an examination of the candidate's ability to do research, analyze data and draw conclusions. Accounting curriculums must change to help students be better prepared for the professional challenges that lie ahead.

As an impetus to change, the Accounting Education Change Commission (AECC) (AECC, 1990) as well as many professional accounting firms, have encouraged college accounting programs to be innovative in their curriculums. Accounting professors are paying more attention to how students learn. Accounting textbooks include learning objectives and numerous active learning exercises. The most recent challenge is to assure these innovations help students develop the critical thinking skills need to analyze information not only on the CPA examination but also in their every-day work in business organizations.

## PRIOR RESEARCH

More than a decade ago, Riordan (1992) identified the changing demands on accounting graduates. He cites that "there exists a long and distinguished body of literature in the field of education reflecting the view that the only effective way to teach people to become critical thinkers is to engage them in critical thinking." However he cautioned accounting educators to be cautious about changes without fully understanding the process of learning. In 1993 Doney, Lephardy and Trebby published "Developing Critical Thinking Skills in Accounting Students" encouraging accounting educators to focus on activities that would aid students to approach non-structured situations. In 1995, Kimmel suggested critical thinking must be broken down into identifiable components. In 1997, Reinstein and Bayou indicated that critical thinking focuses on problem identification and problem solving and is a rational response to questions that cannot be answered definitively. Their article identifies three alternative forms of a decentralized method of critical thinking: (1) the separate-teaching form that directly covers critical thinking in a specific program of

teaching (2) the teaching mode form and the discipline-free learning form both of which indirectly cover critical thinking skills without explicitly teaching the critical thinking literature. Each of the three approaches can serve different needs for different participants in different environments. They urge accounting educations to understand the differences before developing accounting program grounded on critical thinking in form, substance and function.

Bonk and Smith (1998) suggested the consultative model of teaching could help students develop the critical thinking skills and provided many critical and creative thinking techniques, activities and examples to develop accounting students' higher-order thinking. Kern (2000) specifically identified a financial statement analysis project to develop thinking skills. This project required accessing information from the World Wide Web, having students perform financial statement analysis and engaging in an exercise with other students who have analyzed firms in the same industry.

Springer and Borthick (2004) introduced a business simulation in the introductory accounting class in order to develop critical thinking skills. They emphasized the need for students to develop their own understanding of the subject rather than inheriting the teacher's words. In this exercise, students were evaluated on both the accuracy of the calculations as well as the relevance of written advice memos. They felt the simulation was in shifting students from simply transmitting knowledge gained from instructors to constructing their own understanding. In the intermediate accounting course, Calanach, Croll and Grinaker (2000) reported using a business activity model in order to develop students' critical-thinking, communication and research skills.

Currently there is not enough evidence to conclude whether or not the introduction of critical-thinking skills improves students' performance on in-class examinations. Will students who are exposed to critical thinking activities such as simulations in class perform better on in-class examinations? It is hoped that students who develop critical thinking skills in college accounting classes will perform better on the CPA examination and on the job. This paper reports on a research study that explores this issue of using simulations to develop critical thinking skills in students studying intermediate accounting. The paper describes the research design, the results and the conclusions of the study.

## **RESEARCH DESIGN**

This study focuses on the effectiveness of a critical thinking exercise assigned to students by faculty employed at two private universities in the northeast. Both institutions offer a business major and an accounting major within their respective schools of business. Overall, the universities have similar class sizes and teaching orientations.

During the Fall 2004 semester, two faculty teaching the first intermediate financial accounting course required students to complete a homework assignment dealing with the preparation of the cash flow statement. Students were also asked to complete the simulation exercise in the text. The simulation exercise required students to not only prepare a cash flow statement from the data presented, it also required the students to perform analysis and draw conclusions about the liquidity and financial flexibility of the company. The simulation in the text is similar to the type of question that will now appear in the new computerized format of the CPA examination. All students completed the traditional homework assignment. All of the students were required to complete the preparation of the cash flow component of the simulation. However only half of the students were asked to answer the critical thinking questions dealing with the analysis and conclusions concerning the liquidity and solvency of the company.

All students received the same lecture. There were a total of 57 students in the study. Twenty-four students studied in one university, 33 from the other. Of the 57 students, 31 performed the analysis component of the assignment while 26 students did not. Table 1 provides demographic information about the students. All of the full-time students fell in the traditional age group. Most of the part-time students were over the age of 24. Most of the students were accounting majors.

Table 1: Demographics Of Sample

Item	University #1	University #2
SAT scores: Verbal	496	521
SAT scores: Math	537	571
Fulltime	19	28
Part-time	5	5

Students were told that the examination would include the subject of the cash flow statement. They were not informed that the test would include analysis and conclusion concerning the liquidity of the company. The examination questions had three parts: (1) preparation of the cash flow statement (2) analysis and conclusions on the liquidity of the company and (3) analysis and conclusions on the solvency of the company.

Our research hypotheses were as follows:

**H1:** (Preparation) Students who were required to answer the critical thinking questions as part of the simulation exercise would perform better on the preparation of the cash flow statement, than those who were not required to do so.

**H2:** (Liquidity) Students who were required to answer the critical thinking questions as part of the simulation exercise would perform better on the analysis and conclusions related to the liquidity of the company than those who were not required to do so.

**H3:** (Solvency) Students who were required to answer the critical thinking questions as part of the simulation exercise would perform better on the analysis and conclusions related to the solvency of the company than those who were not required to do so.

In order to grade the students' responses a grading grid was established. A total of 100 points was assigned to the preparation of the cash flow statement. Table 2 presents the seven-point scale that was developed to assess the critical thinking skills of the student in responding to the analysis and conclusion requirement. Both instructors reviewed the scoring together to assure consistency of interpretation of the grid.

Table 2: The Grading Grid

Level Of Ability	Score
Did not answer or gave wrong answer	0
Able to define concept (liquidity or solvency, whichever applied)	1
Provided some ratio or analysis to support explanation but not most relevant ratio	2
Drew correct conclusions based on some analysis but not most relevant ratio for the analysis	3
Provided the most appropriate or relevant ratios (liquidity or and solvency, whichever applied)	4
Provided some calculation of the relevant ratios the concept (either liquidity or solvency) but made some error in analysis or conclusion	5
Drew correct conclusion based on correct calculation of the most relevant ratio for the concept (either liquidity or solvency).	6

## RESULTS

The students' grades on the preparation part of the exam and the scores assigned by the instructor to the students' analysis and conclusions on the liquidity and solvency questions were analyzed. The first question on the examination required students to prepare a cash flow statement. All students were assigned problems prior to class to prepare cash flow statements. The examination question was graded on the basis of 100 points. Table 3 summarizes the scores on the exam for the two groups:

**Table 3: Mean Grade On The Preparation Of The Cash Flow Statement**

<b>Group</b>	<b>Number</b>	<b>Grade</b>
Were required to complete critical thinking questions prior to examination	31	85.6
Were not required to complete critical thinking questions prior to examination	26	71.3

Students who were required to complete the critical thinking component of the simulation assignment prior to taking the examination scored 14% higher than those students who only performed the preparation question.

Using the t-test for two-sample assuming equal variances, this difference was a significant at the 99% confidence level. Table 4 provides the statistical analysis results using the t-statistic function in EXCEL. Thus, even though the question asked for a basic preparation of the cash flow statement without any analysis or conclusions, students who engaged in the critical thinking exercise prior to the examination performed better.

**Table 4: Results Of Mean Grade On Preparation Of Cash Flow Statement**

<b>t-Test: Two-Sample Assuming Equal Variances</b>	<b>Variable 1</b>	<b>Variable 2</b>
Mean	85.64516129	71.34615
Variance	149.5698925	525.1154
Observations	31	26
Pooled Variance	320.2723889	
Hypothesized Mean Difference	0	
Df	55	
t Stat	3.004527862	
P(T<=t) one-tail	0.001999877	
t Critical one-tail	1.673033966	

As shown in Table 5, students who were required to complete the critical thinking component of the simulation assignment prior to taking the examination scored 29% (3.42 compared with 2.65) higher than those students who only performed the preparation question. Students who were required to analyze liquidity and draw conclusions on a homework assignment performed better than those who were not engaged in the critical thinking exercise prior to the examination performed better. However, the t-test for two-sample assuming equal variances did not support a statistically significant difference between the groups at a high confidence level. Table 6 provides the statistical analysis results.

**Table 5: Mean Score On The Liquidity Analysis**

<b>Group</b>	<b>Number</b>	<b>Liquidity Score</b>
Were required to complete critical thinking questions prior to examination	31	3.42
Were not required to complete critical thinking questions prior to examination	26	2.65

Students who were required to complete the critical thinking component of the simulation assignment prior to taking the examination scored 17% higher (2.52 as compared to 2.08) than those students who only performed the preparation question. Students who were required to analyze solvency and draw conclusion on a homework assignment performed better than those who were not engaged in the critical thinking exercise prior to the examination performed better. However, using the t-test for two-sample assuming equal variances, this difference was not significant at a high confidence level. Table 8 provides the statistical analysis results.

**Table 6: Results Of Mean Score On The Liquidity Analysis**

<b>t-Test: Two-Sample Assuming Equal Variances</b>	<b>Variable 1</b>	<b>Variable 2</b>
Mean	3.419354839	2.653846
Variance	5.51827957	4.075385
Observations	31	26
Pooled Variance	4.862418227	
Hypothesized Mean Difference	0	
Df	55	
t Stat	1.305431416	
P(T<=t) one-tail	0.098590312	
t Critical one-tail	1.673033966	

**Table 7: Mean Score on the Solvency Analysis**

<b>Group</b>	<b>Number of Students</b>	<b>Solvency Score</b>
Were required to complete critical thinking questions prior to examination	31	2.52
Were not required to complete critical thinking questions prior to examination	26	2.08

**Table 8: Results Of The Mean Score On The Solvency Analysis**

<b>t-Test: Two-Sample Assuming Equal Variances</b>	<b>Variable 1</b>	<b>Variable 2</b>
Mean	2.516129032	2.076923
Variance	5.391397849	4.633846
Observations	31	26
Pooled Variance	5.04705617	
Hypothesized Mean Difference	0	
df	55	
t Stat	0.735155557	
P(T<=t) one-tail	0.232684046	
t Critical one-tail	1.673033966	

**DISCUSSION**

While the scores were better for all three components tested, only the first hypothesis can be supported by statistical analysis. While students in both groups did achieve higher scores both of the critical-thinking questions, neither hypothesis can to supported by statistical difference of the means. A limitation of this study is the small sample size. Also, students were not told that such questions would be on the examination. Many students indicated in a follow-up questionnaire that had they been informed that analysis and conclusion-type questions would be on the examination, they would have been better prepared. Future research should explore the impact of feedback on homework assignments as well as the use of rubrics in providing guidance on how to improve the response to the critical thinking questions.

**CONCLUSION**

It is imperative that accounting educators consider how to develop critical thinking skills in accounting courses if students are to be successful on the CPA examination and in their career.. Our study, which dealt specifically with accounting education, supports our three hypotheses by providing evidence that students who participated in a critical thinking activity on the subject of cash flows performed better on the preparation of a cash flow statement, the analysis and conclusions about the liquidity of the company and the analysis and conclusions about the solvency of a company.

To improve the overall score of students on critical thinking questions that involve analysis and conclusions, instructors should develop rubrics identifying what makes an answer acceptable and how to communicate a deeper and fuller response. Developing rubrics is a time-consuming activity. Many professors are unfamiliar with this task. Even after developing a rubric, more effort is required to provide essential feedback to the student. The results of this research project suggest that improvements can be made in the critical thinking skills accounting students when students are given critical thinking assignments. As accounting professors develop more effective teaching tools, students will perform even better at critical thinking activities.

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