The Management Accounting Simulation: An Approach To Bringing Decision Making Into An Introductory Managerial Accounting Course

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Abstract

The Accounting Education Change Commission has recommended accounting courses include a focus on non-technical skills, such as written and oral communication, teamwork, problem solving, and critical thinking skills. Employers of entry-level managerial accountants have indicated these skills are necessary, but that students are also lacking in technical cost or managerial accounting preparation. To address these concerns, students enrolled in an introductory managerial accounting course were given the management accounting simulation by Kenneth R. Goosen to supplement the managerial accounting textbook, i.e., Managerial Accounting, 10th Edition, by Garrison and Noreen. The techniques used in the course included a number of pre-decision exercises intended to prepare the students for the actual simulation as well as understand various management accounting techniques that would be useful in the decision making aspects of the simulation. This paper will discuss the implementation of the simulation into the course as well as students opinions on various aspects of the simulation experience.

Introduction

Managerial accounting is a required cognate of most accounting and other business degree programs. It is often taught in the semester after students have taken an introductory financial accounting course. Managerial accounting is primarily concerned with providing information for internal users of a business as contrasted with financial accounting providing information primarily for outside users. There are managerial accounting textbooks that do a satisfactory job alone with assisting students to work with and comprehend the managerial accounting topical material. However, there are some inherent weaknesses in using a textbook

only for teaching managerial accounting. These weaknesses include a piece-meal methodology where problems are not related or integrative; students having little or no opportunity to be decision-makers; important relationships are not sufficiently recognized; the interaction between management and the management accountant is not experienced; the opportunity to prepare budgets or profit plans based on the students own decisions does not exist; opportunities for creative and innovative approaches to learning are minimal; and also the traditional methodology does not allow students to experience the consequences of good and bad decisions.

The traditional textbook only approach would seem to not be sufficient for meeting the charge of the Accounting Education Change Commission (AECC, 1992) which has recommended accounting courses to include a focus on non-technical skills, such as written and oral communication, teamwork, problem solving, and critical thinking skills. In part as a response to this recommendation, the researcher has chosen to add as a supplement to the class textbook, Managerial Accounting, 10th Edition by Garrison and Noreen, a management simulation program authored by Kenneth R. Goosen (1994).

Innovation in managerial accounting is important for students to appropriately give them hands-on experiences that could assist them in their learning. Friedlan (1995) found that the teaching approach in introductory financial accounting significantly affected students' perceptions of accounting. He found that a nontraditional course provided students with accounting career skills perceptions that more closely corresponded to those skills perceived by the Accounting Education Change Commission. A traditional approach did not alter students' perceptions in the desired direction. A focus on problem solving skills and the organizational context of decisions in managerial accounting can yield students who add value to the organizations they join (Maher, 2000).

The AECC recommends that the introductory accounting course attempt to improve written and oral communication skills, teamwork skills, and analysis and critical thinking skills (AECC, 1992). The difference in perspective between managerial and financial accounting can be utilized to implement the AECC recommendations. Financial accounting reports the results of completed transactions in a neutral, objective manner. Managerial accounting has a more forward, proactive perspective. Managers need to prepare for a range of possibilities, and indeed, try to influence volume levels and resulting profits. The information needs of management provide the opportunity for students to formulate recommendations through discussion and thus improve analysis, critical thinking, and oral communication skills. If active learning, group exercises are used, then teamwork skills may also be improved.

Criticisms of student skill levels in managerial accounting have been in the technical, managerial accounting knowledge area and the interpersonal, communication, and problem solving area (Novin, etc. 4, 1990). An effective course should have a balanced approach that reinforces the technical content and develops the non-technical skills. The focus is one of understanding the business implications of the techniques, instead of memorization of the rules.

This paper will discuss the implementation of a managerial accounting simulation authored by Kenneth Goosen (1994) into an introductory managerial accounting course. This will include discussions about the general focus of the simulation itself, a description of how the simulation is presented to the students through managerial accounting concept exercises, description of the simulation itself, simulation decisions by the student groups, results of those and future decisions. There will then be a discussion regarding the results of a student questionnaire given to students on their experience of the simulation.

The Management/Accounting Simulation

The Management/Accounting Simulation was authored by Kenneth R. Goosen of the University of Arkansas at Little Rock. This simulation is a business enterprise simulation designed specifically for management accounting courses. It is a simulation of a manufacturing business that requires students to make marketing, production, and financial decisions. The simulation allows the use of all major management accounting techniques and is not interactive, that is, decisions of one team do not affect the results of another team.

Students partaking in the simulation are required to analyze, interpret, and use financial statements; analyze economic data and use quantitative tools; prepare profit plans (budgets); sort relevant data and information from the irrelevant; see and understand different types of relationships including decision relationships, financial statement relationships, marketing-production-finance relationships, and organizational relationships.

The major focus of the simulation is decision-making. For each decision, one or more management accounting techniques may be used by the students to enhance the probability of a proper and logical business decision. The Management/Accounting Simulation text book comes with 24 separate but sometimes related cost analysis problems (exercises). Some of the exercises are related in that they may build upon data arrived at in previous exercises. These optional exercises stress certain management accounting techniques that students will need to be proficient for success in managing the company to profitability. It is up to the instructor to best decide on which exercises to assign. The approach of the professor of this paper was to assign those exercises which were not, in his opinion, covered adequately for the purposes of the simulation, in the regular course textbook. An exercise assigned was the Budget exercise which went into much more detail than the chapter in the regular textbook. As it was essential for

success in the simulation, the "practice" budget served as a good learning tool for the students to get a deeper understanding of how budgets work and how they can be useful in management accountant's decision process. As each exercise takes from 1 to 5 hours on average, to assign too many exercises could begin to conflict with assignments of the regular text as well as contribute to excessive student workload.

Integration of Simulation into Course

The management simulation was integrated throughout the semester course. Discussions about the simulation did not begin in earnest until about the 5th week of the course although students were made aware of this project in the course syllabus and in the introductory comments on the first day of class. From week 5 till week 9, individual exercises that intended to have students become familiar with various types of information and decisions that managers make and that would be useful for the simulation were assigned on a weekly basis. Most of these managerial accounting concepts covered in these exercises had just recently been discussed as part of the regular textbook discussions, assignments, and exams. These included exercises relating to cost behavior analysis, cost-volume-profit analysis fundamentals and decision making, absorption costing versus direct costing, comprehensive budgeting problem, and flexible budgeting. (As an example of these types of exercises, Exhibit A is included in the appendix: CAP 4, the exercise on Cost-Volume-Profit Analysis and Decision Making.) An introductory presentation of each of these exercises was made prior to the student's requirement to complete them.

In the class that the exercise assignments were due, the professor went over the procedures as well as the answers to the exercises. The exercises were returned to the students graded and with instructor comments. Most of these 7 exercises took from 1 to 5 hours outside of

class time for students to complete. They were allowed do these assignments by themselves or with one other student. Note that the simulation text book that the students must purchase does have a total of 24 exercises, i.e., cost analysis problems, of which this professor selected these 7.

After the exercises were completed, around week 9, description of the actual simulation case was presented to the class. The students self-selected into groups of 2 to 4 members. Each student groups were given information about a firm, e.g., V.K. Gadget Company that has been experiencing financial difficulties. Each student group was to take over management of the company and make a number of marketing decisions, production decisions and financial decisions. As indicated above, this simulation is not interactive, that is, decisions of one team do not affect the results of another team.

The simulations has two basic objectives: 1) To increase the student's understanding of the importance of management accounting as containing a set of tools useful in making decisions and 2) To be an instructional tool that increases the student's ability to use management accounting techniques and concepts. (Goosen, 1994, p. 1) The simulation experiences provide the opportunity for student teams to make reasonable and insightful decisions based on their use of the various managerial accounting and other tools that they have picked up in this and other courses.

In the last half of the semester, the students became the managers of the troubled firm. Each group was required to submit decisions regarding marketing, production, and financing, etc., to the instructor (on a computer floppy disk) who then ran their decisions on a computer that generates results in the form of financial statements as well as summary data. The actual simulation program is available to instructors to download onto their own computer. This program contains all the factors necessary to run the simulation.

Each group was required to submit the decisions (approximately 24 different decisions) as well as a paragraph on the reasons they made certain decisions for 3 to 4 of those decisions. See appendix B for a listing of the required decisions. The primary evaluation of the group was not whether the group was able to improve the company's financial position but rather their reasons for making whatever decisions they made. The simulation grade accounted for 15% of each student's final grade.

The time frame in the simulation itself for monthly decisions can extend to 12 months. Instructors can require as few as one month or as many as twelve month's worth of decisions. After running the decisions through the simulation program, a set of financial statements is generated. This data, along with the professor's evaluation of their reasons for the group's decisions is returned to the students. Each group than had approximately 2 weeks to submit decisions for the next month. It was hoped that each group would improve on their decisions because of the course material itself, the exercises done before the actual simulation began, and also in looking at the results from previous months decisions. This gave the students the experience of using not only their technical knowledge of the material covered in this and other classes, but also gave the opportunity to learn from their previous simulation decisions.

Outcome Assessments of the Survey

Attached in Appendix C is the survey completed by 50 managerial accounting students at the end of the spring 2003 term from an AACSB accredited university. The survey was completed on the last day of class, was optional on the part of the students, was anonymous, and did not impact the grades of any students. There are a number of observations that can be made regarding this information. As is indicated in Table 1, the most important information was the overwhelming opinion by the students to keep the simulation as part of the course (.88 average

indicating a strong opinion to keep the simulation), and a very high opinion that the simulation helped them to see how managers make decisions (.98 average out of 1.00 possible). Other interesting factors included a fairly positive opinion on the small group experience, a slight preference to making decisions in a small group versus individually, and an opinion that the simulation was a somewhat valuable experience.

After doing the above analysis, I separated the students whose opinion was to keep the simulation as part of the course (39) from those students whose opinion was not to keep the simulation in the course (4) as well as those students whose opinion was unsure as to whether to keep the simulation (7). For my analysis I grouped together both the students whose opinion was to not keep the simulation and those unsure of whether or not to include the simulation. I then compared these two groups' responses to the survey questions. Obviously the two groups are not large enough nor close enough in size to do statistical analysis but there are some interesting observations I noted in my comparison of the two groups: Those who's opinion was to keep the simulation saw it as having greater value; felt it was more connected with the material covered in the course; spent on average more than an hour and a half than the other group on each month's simulation decisions; felt the simulation experience enhanced their ability to work on a team; had the opinion that the group process of making decisions to be a more positive experience; preferred working in a group to doing the simulation individually; and had a half-grade higher grade point average (self-reported). Although not statistically significant, this data would seem to indicate that the harder-working (time spent on simulation), higher-gpa students did have the opinion that this was a valuable, positive experience as compared to those students whom did not work as hard or have the higher gpa's. This would make intuitive sense: the simulation requires a significant amount of time and effort and for some students this is not what they are interested

in. The question is whether this experience is helpful for their understanding of the accounting material. Based on this experience, I believe that the simulation is very helpful for the majority of students.

Conclusion

The author of the simulation also provides a user's guide to assist the instructor with the use of the simulation. Goosen strongly suggests that an instructor including the simulation plan on spending a number of months prior to the semester familiarizing herself with the simulation and the simulation process. The simulation is quite understandable but is also very complex and requires a fair bit of computer understanding. The processing of the decisions of the students also requires some learning time on the part of both the students and the instructor.

This was the first time that this professor included a simulation in his managerial accounting course. As such, there was a fair bit of "start-up" costs, especially time, that was required to get the simulation up and running as well as providing enough training for students to be able to complete the simulation project requirements, including the simulation exercises. It is expected that future simulations will run more smoothly as a result of the learning for this first simulation semester. This being said, the simulation was very much a worthwhile endeavor, as evidenced by the responses from the students and the impressions of the professor who used the simulation for the first time. It also must be acknowledged that a number of the respondents did indicate that the simulation should not be continued but this group appears to be primarily composed of those students who have not exhibited the higher gpa's nor, by their own admission, work as long (and arguably as hard) as the students who did spend a significant time (as they reported) on the simulation decisions.

The simulation does provide a way for students to put into practical usage the material

covered in the managerial accounting course. This practical experience may high light the concepts covered in the course in a way that traditional testing does not. This should have a positive impact on the students' understanding and comprehension of the material. Ultimately, this is what a managerial accounting course should accomplish for its students. The simulation arguably does assist in meeting the charge of the AECC by bringing into focus on non-technical skills, i.e., allowing the students to make important and critical decisions in marketing, production and financial decisions; increasing written and oral communication skills through the requirement that the primary evaluative tool for the instructor is the reasons that a team made certain decisions; having experience working in teams; providing experiences to assist future accountants to become problem solvers; and also to increase within students their critical thinking skills.

References

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TABLE ONE—RESULTS OF SURVEY

Attribute	Mean	Median	Minimum	Maximum
Valuable Experience	2.268 (closer to somewhat valuable than neutral)	2.00	.5	4.5
Connected w/class material	2.382 (somewhat closer to quite connected than neutral)	2.00	.5	4.0
Avg. time spent per decision process	3.42 hours	2.00	.5 hours	40 hours
Opinion: decisions in small or individual	.040 (prefer group decision to individual decision)	0	NA	NA
Number in group	3.06	3	1	5
Opinion on group experience	.78 (fairly positive experience)	1	NA	NA
Opinion: group decision-pos/neg	2.208 (closer to quite positive than neutral)	2.00	NA	NA
Expected grade	3.27	3.3	2.0	4.0
Keep/not Keep simulation	.88 (preference to keeping the simulation)	1	NA	NA
Overall GPA (self-reported)	3.22	3.2	1.6	4
Realistic decision making experience	.979 (high opinion that this was a realistic decision making experience)	1	NA	NA

APPENDIX A

CAP 4 Cost-Volume-Profit Analysis and Decision-making

For several months in a row the V. K. Gadget Company has incurred net operating losses. Based on sales of 8,734, the V. K. Gadget Company incurred in March a net loss of $299,180 after tax and a net operating loss before tax of $470,452. Realizing that the Company cannot continue to sustain losses, management has tentatively decided to change certain decisions to be implemented in April.

	March's Decisions	**Proposed Decisions**
Price	$ 200	$ 220
Sales person's salary	$ 600	$ 700
Number of sales people	675	450
Advertising	$297,200	$350,000
Cost of Material X per unit	$6.90*	$3.50
Commission rate	12%	16%

*Includes freight

Fixed and variable costs/expenses information as computed in CAP 3 is:

Fixed costs/expenses:	
Marketing	$887,735
General and administrative	$109,167
Manufacturing	$310,149
Variable cost rates:	
Cost of goods sold	$69.15
Marketing	$31.43
General and administrative	$ 3.44

Answer the following questions. For each question carefully document your answer. In each case use March's decisions, except for the decision being analyzed. Also use the fixed and variable cost data computed in CAP 1.

A. If price is increased from $200 to $220, by how many units can sales decrease and net operating loss be the same?

B. If total sales people salaries are decreased as proposed, and assuming the same net operating loss, then sales (units) may decrease by how many units?

C. If advertising is increased by $50,000 dollars, then sales must increase by how many units in order for the operating loss not to become larger?

D. If Material X can be purchased at a price of $3.50 and the same number of units are sold, then the net income/loss will be $ _____.
Note: The Company's product requires four units of material X.

APPENDIX A (CONTINUED)

E. If the commission rate is increased to 16%, then sales must increase by what amount in order for the net loss to be the same?

F. Assume that management wants to attain an income of $200,000 before income tax, and that all of the proposed decisions are implemented.

Answer the following:

1. The variable cost rate would be: $_____
2. The contribution margin rate would be: $ _____
3. The breakeven point would be: $ _____
4. The target income point (units) would be: $ _____
5. The total contribution margin at target income point would be: $ _____

APPENDIX B

DECISIONS SHEET

Team Name _____ Period _____

Course _____

Decisions	**Decisions Values**
Note: Do not enter leading zeroes when using Student Input Program	
1. Team Number* (See note above)	_____
2. Team Name and Course Number	_____
3. Ending Date of Income Statement	_____
4. Period of play	_____
MARKETING DECISIONS	
5. Price	_____
6. Budgeted advertising:	_____
Territory 1	_____
Territory 2	_____
Territory 3	_____
Territory 4	_____
7. Number of sales people:	
Territory 1	_____
Territory 2	_____
Territory 3	_____
Territory 4	_____
8. Salary per sales person	_____
9. Commission rate per sales person	_____
10. Credit terms (0 or 3 months)	_____
PRODUCTION DECISIONS	
11. Budgeted production	_____
1 2. Additional production equipment units:	
Cutting dept	_____
Assembly dept	_____
13. Number of factory workers:	
Cutting dept (include 2nd shift)	_____
Assembly dept (include 2nd shift)	_____
14. Labor wage rate:	
Cutting dept	_____
Assembly dept	_____
15. Material X:	
Order size	_____
Number of orders	_____
16. Material Y:	
Order size	_____
Number of orders	_____
17. Material X Supplier	
18. Replacement of F. D. Equipment	_____

APPENDIX B (CONTINUED)

19. Second shift or Overtime _____
    Cutting dept (1 = SS. 2 = O.T.) _____
    Assembly dept (1 = SS. 2 = O.T.) _____
    Finishing dept (1 = SS. 2 = O.T.) _____
20. Additional volume _____

FINANCIAL DECISIONS:

21. Accts. payable payments _____
22. Notes payable payments _____
23. Retirement of bonds (No. of bonds) _____
24. Bank loan request _____
25. Issue of securities:
    Number of bonds _____
    Number of stockholder shares
26. Dividends payments (Total) _____
27. Minimum acceptable selling price of stock _____
28. Investment in U. S. General Co. Stk. (No. shares) _____
29. Factoring of Accts. Receivable _____
30. Purchase of Treasury Stock (No. of shares) _____
31. Sale of U.S. Gen. Co. Stk. (No. of shares) _____

APPENDIX C-STUDENT SURVEY ON SIMULATION

As you know, this is the first time I have used the simulation in the managerial accounting course. I would be interested in your responses to the following questions. Your grade will in no way be impacted by your responses.

How valuable and useful do you think the simulation was in your business academic training? (Indicate with a mark on the line for your opinion.)

_____

Extremely Valuable	Somewhat Valuable	Neutral Valuable	Not very Valuable	Not at all Valuable

Do you think that the simulation was connected with the material we covered throughout the course?

_____

Extremely Connected	Quite Connected	Neutral	Slightly Connected	Not at all Connected

What was the average amount of time you spent in your groups working on one month's decisions for the simulation? _____

Should the decisions for the simulations be done in small groups or individually? _____
How many people were in your group? _____ number of women ___ number of men _____
Do you think that this experience enhanced your ability to work on a team? _____

Do you feel that having the decisions made in a group to be positive experience?

_____

Extremely Positive	Quite Positive	neutral	Somewhat Positive	Not at all Positive

Would you prefer to make the decisions by yourself and not in a group? _____

What grade do you expect to receive in this course? _____

Would you recommend that I keep the simulation as part of this course? _____

Gender _____ Overall GPA _____ International Student _____ (yes or no)

Did the simulation give you some understanding of how managers make decisions? _____ (yes, no or don't know)
Did the simulation help you see how managers make decisions? ____