

Learning Managerial Accounting in Lower Division: a Three Phase Project Approach

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Abstract

This paper presents a project for use in a lower division introductory managerial accounting class to engage students in active learning. We designed this project to be presented to the students over the course of study in three phases with the following objectives: to relate cost concepts to one another in a meaningful way and to relate these cost concepts to a realistic scenario to exemplify how these concepts affect real world business decisions. The project itself asks students to consider starting a printed T-shirt shop in a local mall and then introduces concepts such as variable and fixed costs, unit product costs, breakeven analysis, variable and absorption costing and reporting, and the cash budget. This paper describes each phase of the project and the corresponding learning objectives, discusses how the project was used most recently in Fall, 2013, and provides complete instructions and documentation for each phase for instructors who wish to use or adapt our project for their classes. Anecdotal evidence from student feedback indicates that the project meets its objectives.

Keywords: managerial accounting, variable and fixed costs, breakeven analysis, cash budget

Introduction

Instructors those who teach lower division managerial accounting, often use cases or projects as part of their teaching curriculum. There are a number of cases and projects available for public use. However, some cases are too complex for lower division students, and some are too simple to apply a large portion of the classroom concepts to a single project. We extended an idea from Activities in Management Accounting by Martha S. Doran (Prentice Hall, 1996) to a three phase project and have been refining it since 1996. We used it most recently in Fall 2013. This three phase project begins with simple cost concepts and works through cost-volume-profit analysis, variable and absorption costing, cash budgeting, and finally strategic decision making, using a scenario in which the students in a small business startup setting engage in making and selling T-shirts in the local shopping mall. The complexity of this project can be modified according to the teaching plan of the instructors and the background of the students. The purpose of

using a project with a simulated real-word setting is threefold. First, using projects allows the students to participate in the learning process (active learning) which engages them more, and facilitates understanding and retention. Second, the project utilizes material from several different chapters in the textbook so that students understand that these topics are not separate and discrete, but interrelated. Third, because the project is based on a realistic scenario, it helps students understand how managerial accounting concepts relate to real world business decisions. We believe that this approach is especially suitable for business students who would like to start a small business in the future. In addition, we designed the project in three phases so that instructors could monitor students' learning outcomes and students could also learn and correct mistakes from their earlier phases prior to working on the next phase.

This paper proceeds as follows. First, we discuss the current challenges of teaching a lower division managerial accounting class and how our project addresses these

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challenges. Next we describe each phase of the project and the learning objectives associated with each phase. We discuss the implementation of the project specifically in Fall 2013, the grading of the project, and student feedback. The full text of the project is provided in the appendices. Solutions are available from the authors upon request.

Teaching Lower Division Managerial Accounting

Managerial accounting has been traditionally a required lower division course in the business school. Nevertheless, this requirement has been extended to other non-business studies as well. There are several challenges in teaching a lower division managerial accounting course to a diversified student body. First, many students are simply not motivated. Students, especially those who are not accounting majors, do not understand how managerial accounting could be related to or is useful for their majors, options or concentrations. They hear the word “accounting” in the title of the course and feel that this cannot be relevant to marketing or human resource management or operations management, or worse, any non-business major that requires this course such as engineering or even nursing.

A second challenge in teaching managerial accounting at any level is getting the students to understand how material in different chapters, which are often taught as discrete topics, is actually interconnected and interrelated. For example, a student may understand how to create a cost equation ($Y = a + bX$) and understand how the contribution format income statement is prepared, but may not realize that the cost equation feeds into the contribution format income statement, or how the cost equation for overhead relates to the variable overhead rate and budgeted fixed overhead costs in the overhead budget.

Finally, it is difficult to engage students, even accounting majors, in learning managerial accounting if the learning is all passive. Traditionally, accounting courses were taught

using lecture and examples, assigning homework and giving exams. More recently cases have been incorporated into the teaching of many subjects including managerial accounting, as evidenced by the number of cases available for use in the course. Research (for example, “Does Active Learning Work? A Review of the Research.” Michael Prince, *J.Engr. Education*, 93(3), 223-231 (2004)) indicates that active learning activities such as case studies, collaboration and discussion can be more effective for student understanding of material, and that, students who discuss course material with classmates are both more engaged and retain more than students who only experience passive learning techniques.

Our project addresses all these aspects of learning. First, the project is a group project, so it combines the use of case studies and group discussion, engaging the students in an interesting realistic project. Next, because it is a project in three phases covering many of the topics in a basic managerial accounting course, it illustrates the relationship among the various topics and chapters in managerial accounting. Finally, because it deals with a realistic situation, it helps students connect the classroom material to real world issues and in some ways demonstrates how managerial accounting knowledge is useful in business regardless of one’s area of study.

Our lower division managerial accounting class is a sophomore level introductory class required for all business majors. We typically teach large sections ranging between 50 and 150 students depending on the time of day, the room capacity, and the number of sections offered in that session. Although the course is a prerequisite for the business program, there are still a few students who “escape” the requirement until their senior year, so the class usually has a range of students from sophomores to seniors. The class covers the usual basic topics found in any managerial accounting textbook (cost concepts, job order and activity based costing, cost-volume-profit

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relationships, variable and absorption costing, budgeting, responsibility accounting, and capital budgeting.) Our project touches on most of these topics. The project itself is described in the following section.

The Project

Our project was designed specifically for an introductory lower division managerial class and the purpose is to introduce simple basic cost concepts and show how all these concepts are interrelated, and how they relate to real business decisions. We created it specifically to be a group project because we wanted the students with different background to contribute their specialty and to collaborate and discuss the concepts, although it could easily be modified and assigned as an individual project.

As mentioned before, this project is assigned to the students in three phases. The first two address learning in only the basic levels such as recall and comprehension. Phase Three requires more advanced thinking, such as application and even evaluation of information. (Bloom's Taxonomy of Learning Domains, 1956. <http://www.nwlink.com/~donclark/hrd/bloom.html>). Each phase of the project is described below, followed by a discussion of the implementation and grading of the project.

Phase One

In the first phase of the project, students are given the setup. They are starting a printed T-shirt business in a local mall and, to motivate group interaction, their first task is to choose a name for their firm. They are given a list of costs they will incur for the startup, and must then determine which costs are variable and which are fixed and also which are manufacturing and which are non-manufacturing. After classification of costs, students are to express costs in the form of the cost equation $Y = a + bX$, where Y is total cost and X is number of T-shirts produced and sold. Finally, they are to calculate the total costs, revenues and profit at an expected sales

volume of 7,800 shirts. (The sales volume can be assigned differently for each group. An Excel answer spreadsheet for grading is available upon request.)

After finishing Phase One of the project, students should

- Be able to distinguish between manufacturing (product) and nonmanufacturing (period) costs
- Understand the difference between variable and fixed costs, and understand how to express each as variable costs per unit and total fixed costs per year
- Understand why it is important to classify costs as manufacturing and nonmanufacturing, and as variable and fixed
- Understand how to express variable and fixed costs in a cost formula
- Be able to calculate operating profit using revenue and cost formulas

Instructions for Phase One are shown in full in Appendix A. The students are also provided with a blank report form to fill in for each phase of the project. The blank form has two purposes: one is to guide the students so they will have a better idea of what to do. The second is to provide a specific format for student answers, making grading much faster. This is an advantage for the instructor if the class size is large or there are many groups to grade. A copy of the blank report form is provided in Appendix B.

Phase Two

In the second phase of the project, the students continue the same T-shirt business, but extend it to finding operating profit under both variable and absorption costing. This further analysis includes various topics in cost-volume-profit analysis such as contribution margin, the breakeven and target profit points, margin of safety and operating leverage. Students also perform a simple sensitivity analysis assuming first a 20% increase and then a 5% decrease in production and sale of

shirts. Finally, the key difference in variable and absorption costing on operating profit and ending inventory is introduced when number of shirts sold is below number of shirts produced.

After completing Phase Two of the project, students should

- Understand the relationship between the manufacturing cost formula and unit product cost under both variable and absorption costing
- Understand how the unit product costs relate to the income statement for both variable and absorption costing
- Understand how to relate both unit contribution margin and contribution margin ratio to the variable costing income statement
- Be able to find a breakeven point and target profit point in both units and dollars, and understand the relationship between this and the original variable costing income statement
- Be able to calculate a margin of safety in dollars and as a percent of sales
- Be able to calculate operating leverage, use it to estimate profits given changes in sales, and relate this back to the variable costing income statement under the new sales level
- Understand how changes in elements of the cost formula (fixed costs, variable rate) and changes in selling price can affect operating income
- Be able to prepare both an absorption format and variable format income statement under the assumption that they produce more units than they sell, and understand what causes the difference in the two incomes
- Understand what costs comprise ending inventory costs under both absorption and variable costing and why they are different

Instructions for Phase One are shown in full in Appendix C. A copy of the blank report form is provided in Appendix D.

Phase Three

In the third phase of the project, students are ready to explore how to fund their T-shirt businesses. First they must determine how much cash they need up front to open the business, assuming they want to pay fixed costs for the first three months, and variable costs enough to produce 2,000 shirts. Supposing they will borrow this amount to open the business, they next must prepare a cash budget for the year, including payback of as much borrowing as possible. They also must calculate the expected simple rate of return (accounting rate of return) on the project. After a disappointing first year, they are then required to change strategy by changing at least three things (selling price, variable costs, and fixed costs) and use the new information to revise the original total cost formula from Phase One. They must then find the new contribution margin and breakeven point, and using this information, estimate profit at a realistically possible high and low level of sales. Finally, the students are required to assess the future potential of this business.

After finishing Phase Three of the project, students should

- Understand the relationship and differences between expenses and actual cash payments
- Be able to prepare a cash budget for a quarter or year
- Understand how short-term financing works in the cash budget
- Be able to calculate a simple rate of return and interpret the results
- Understand how changes in inputs (variable costs, fixed costs, and selling price,) will affect a firm's contribution margin and breakeven point
- Understand how to make strategic decisions about a firm's costs and prices

- Understand how strategic decisions will affect sales volume and profitability
- Be able to write a simple assessment of the viability of a simple business

Instructions for Phase Three are shown in full in Appendix E. A copy of the blank report form is provided in Appendix F.

Administration of the Project

In Fall 2013 the project was used in two sections of a sophomore level managerial accounting course. At the beginning of the Fall term each section had 73 students, but at the end of the term, after some students withdrew and some just stopped coming, we finished with 60 students in one section and 67 in the other. The students were initially divided into teams of five with a few groups of six to make up for the extra three students per section, totaling 28 groups for the two sections combined. However, as students dropped the class some of the groups were reduced to as few as three students. The students were required to keep the same team members through the three phases of the project, so smaller groups were not combined after losing students.

Instructions for each phase were furnished via Blackboard (an online educational site) along with the blank report form for each phase. The instructions and blank forms were provided in sequence, not all at the same time. This was to keep students from working on a subsequent phase prior to correcting the previous phase, so that errors would not be carried throughout the project. After students turned in their reports for each phase, the instructors returned them with comments and a grade. Each group was required to turn in corrected versions of the previous phase with each subsequent phase. Phase Three was turned in as a complete project, with all three phases (one and two corrected) and a cover sheet.

For each phase all the students in a group were required to sign the first page, ensuring that they had indeed worked on the project. At the

end of the project they were also required to fill out peer evaluations (see Appendix G for the full text of the evaluation.) Most groups worked very well together and had only good things to say about one another, but a few groups had one or two members that the others felt were not contributing, did not come to meetings, failed to do assigned tasks and in one case even refused to give a phone number or email address to the others to allow for contact outside class. Although the group received a grade for each phase of the project, the individual grades were adjusted downward by up to 30% for lack of participation.

On the first day each phase of the project was assigned, the students were allowed to meet during the last 30 minutes of class so they could discuss the project, assign tasks and plan future meetings. Then they had one week to finish the phase and had to turn in their reports in class at the end of the week. Graded assignments were then returned in the next class meeting. Students were required to revise Phases One and Two based on instructor comments on the graded papers. The answers were not discussed in class prior to the completion of the third phase.

Grading

Because the report forms were provided to each group, grading was easy, particularly for Phases One and Two that had specific answers. The first part of Phase Three was also easy to grade but the end of this phase, where students had to propose a new strategy, cost it out, and discuss the future of the firm, took more thought to grade. The instructor graded each phase on a 19 point scale. One point was reserved for following instructions, and each error lost the group half a point. Grades on Phase One ranged from a high of 19 to a low of 10, with an average score of 15.98 in one section and 14.83 in the other.

For Phase Two the rewrite of Phase One counted as one point, as did following instructions. Then students lost half a point for each error subsequent to these two points.

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Again the high was 19, but the low score was 12, and the average score in the two sections were 15.28 and 15.24. Finally for Phase Three the projects were graded on following instructions, neatness, inclusion of the corrected Phase One and corrections to Phase Two. Each error in the budgets and the calculations lost the team a half point. The change in strategy was assigned three points and the final discussion was worth two points. Only one group attained the high of 19. The low score on Phase Three was 8. Most groups lost points on the cash budget, particularly in understanding how to deal with things that cannot be purchased per T-shirt (e.g. reams of transfer paper or inkjet cartridges) or in trying to pay only the depreciation and not the cost of the fixed assets. The average scores were again very close to one another; 14.16 in section one and 14.2 in section two.

While this instructor chose to grade the projects on a 19 point scale, other instructors using these projects can choose any scale and assign points in any way they desire, depending on what they wish to emphasize.

Student perception of the project

It is difficult to provide evidence that this project improves learning, understanding or retention of the material as, even if a section were taught using the project and a section were taught without using the project, the differences in students themselves might cause different outcomes for the two sections. However, we did ask for student feedback regarding their perception of the usefulness of the project. A copy of the questionnaire used is provided in Appendix H. Questions asked about the usefulness of each phase of the project and the project as a whole in terms of understanding the class material, understanding the relationship among cost concepts, and the relationship to real business problems. There was also a question about whether the class spent too much time on the project, and whether a group's team members

were helpful in the work, and were helpful in the understanding of the material.

Although the response rate was disappointingly low (20 out of 127 students, or only 15.7%) the responses were overwhelmingly positive. Many students either agreed or "agreed somewhat" that the project helped them understand not only the material but also how the material may relate to a real business. Unfortunately, one student clearly disliked the project and disagreed with everything except that the class spent too much time on the projects. Overall results of the survey are in Appendix I. There were few student comments about the project, but all comments are provided below, copied verbatim and unedited from the project evaluations:

"I thought the project easily put the class concepts into a real life perspective, but many of the questions were vague and not very straightforward. Also much of it could have been done by just one person, so its not really need in a group setting."

"Great class"

"Great projects. Definitely gives you a hands on perspective."

"Overall this group work was fun and exciting."

"Thanks Dr. XXX! Loved these group projects."

"Great class and great learning experience."

"As for the group project itself I do feel it helps, but also wish we were able to dedicate a little more time on the chapters themselves. It helps because we are able to work and learn from other students."

Based on the evaluation responses and these limited comments, we feel that the project has certainly fulfilled our expectations for it, that it engages the students and promotes learning.

Conclusion

We have presented a comprehensive three phase project designed to reinforce basic cost ideas in a lower division managerial accounting class. Because most introductory

managerial accounting textbooks cover the same set of topics, this project can be used with any book. The purpose of this project is to illustrate how cost concepts are interrelated and how they relate to a real world scenario. It helps students understand how managerial accounting can be useful to business in general, and how it aids in creation of a business strategy.

The project is designed to be worked in groups or teams, to provide the extra advantages that students gain from collaboration, but can be assigned as individual work. It is assigned in three phases, each of which builds on the previous phase. The report forms provided with the project help guide the students in their work. Instructors who choose to use this project may adjust it to be simpler or more complicated, depending on how much of it they wish to assign.

Anecdotal evidence from using this project shows that many students perceive that this

project is useful in learning the cost concepts, how they interrelate, and how they relate to a realistic business proposal.

Bibliography

Bloom, Benjamin. Taxonomy of Learning Domains. 1956. Revised 2000. As discussed in <http://www.nwlink.com/~donclark/hrd/bloom.html>.

Doran, Martha S. Activities in Management Accounting. (Prentice Hall, 1996)

Prince, Michael. "Does Active Learning Work? A Review of the Research." Journal of Engineering Education, 93(3), 223-231 (2004)

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Appendix A
Full Text of Phase One Instructions

Group Project – Phase One

Due: _____

The purpose of this group project is to help you integrate the managerial accounting concepts we cover in class and apply them to a real-world business setting. This project contains three phases. In the first phase, you will analyze your costs and come up with a cost formula for your business. In the second and the third phases, you will make sales forecast, conduct cost-volume-profit analyses, prepare budgeted financial statements, and come up with strategies to improve the profitability of your business. After you complete all phases of this project, you will have good understanding of how managerial accounting tools can help managers run a business.

Group Policy: This project is to be done in groups of *three to five* students. No individual work will be accepted.

Collaboration Policy: You *CANNOT* discuss any portion of this project with anyone outside of your group other than the instructor for this course. Any exchange of information with anyone other than the instructor for this class, whether orally, in writing, or electronically, will be considered a violation of the academic dishonesty policy of this class.

Business Description:

Your project group will assume the role of young entrepreneurs to start a small company. Your company will rent a retail cart inside the *Stoneridge Mall* to buy plain T-shirts and imprint them with one of the twelve beautiful pictures exclusively designed for your company by a famous artist who is a friend of yours. He has agreed to design twelve super attractive T-shirt pictures for you each year at a special discount. Your target customers are teenagers and young adults who have your kind of good taste. Your business is scheduled to launch on January 1, 2014.

Cost information:

- 1) Stoneridge charges you \$2,500 rent *per month*, which includes utilities, telephone, cleaning, and maintenance. You estimated that **90%** of the rent was related to factory operations and **10%** was related to selling and administrative activities.
- 2) You will order white, cotton t-shirts from a T-shirt wholesaler. Each T-shirt costs (including taxes, shipping, and handling) \$3.75 to purchase.
- 3) To store T-shirts that were bought, but *not yet* imprinted, you will rent a storage unit. The storage unit costs you \$125 *per month*.
- 4) You agreed to pay your artist friend a \$10,000 annual contract fee plus a \$300 design fee for **each** of the 12 T-shirt pictures designed. This same term is renewable for the next 3 years. Each T-shirt picture will only be used for one year. Therefore, in the second year, 12 new pictures will be designed at \$300 each and another \$10,000 annual contract fee will be charged.
- 5) You will buy several items before that start of your business:
 - [a] A computer and a printer: You will pay \$6,000 (including taxes, shipping and handling) to buy a computer and a printer. You expect both to last about 3 years without salvage value. You will use the straight-line method for depreciation. You estimate that about 90% of the computer and printer will be used for factory operations and 10% will be for selling and administrative activities.

- [b] A heat press machine: You will pay \$4,500 (including taxes, shipping and handling) for a heat press machine. The machine is used for imprinting t-shirts only and is expected to last 3 years without salvage value.
 - [c] Transfer paper: Each case of transfer paper costs \$400 and contains 1,000 sheets of 8.5×11 transfer paper. You expect to use one transfer paper to print one T-shirt.
 - [d] Ink-jet cartridges: On average, each cartridge costs \$50 and can make 500 prints. Each T-shirt requires one print. You also need to print flyers, etc. for selling and administrative purposes. For this non-manufacturing printing, you will print about one page for every 5 T-shirts sold.
 - [e] Laser paper: You will buy several reams of laser paper to print promotion flyers, etc. Each ream costs \$20 and contains 200 sheets of 8.5×11 laser paper.
- 6) Wrapping paper and box: Each T-shirt costs about \$0.20 to wrap and box. Wrapping and boxing are not considered as manufacturing.
 - 7) You will hire three fellow students as part-time workers. They not only help you operate the machine, but also help fold, wrap and box T-shirts. Sometimes, three of them work at the same time. But, sometimes they don't because of their different class schedules. On average, printing 10 shirts will take one labor hour. Folding and packaging 20 shirts also will take about one labor hour. You will pay each of your workers \$8 per hour. Folding and wrapping are not considered as manufacturing.
 - 8) You (the owners) do all the selling and administrative work by yourselves. You will pay yourselves a total of \$12,000 per year (to be divided among all owners).
 - 9) To protect your business from legal obligation, you will purchase a liability insurance that will cost you \$3,600 per year.
 - 10) You will hold four end-of-quarter parties to promote sales of your t-shirts. Each party costs you about \$1,000.

Phase One Requirements:

- (1) Give your company an attractive name.
- (2) What and how much of your costs are variable costs? List your manufacturing and non-manufacturing variable cost items and present each of them in *cost per T-shirt basis*.
- (3) What and how much of your costs are fixed costs? List your manufacturing and non-manufacturing fixed cost items and present each of them in *total cost per year*.
- (4) Write out your yearly cost formula in $Y = a + bX$ format. Be sure to include both manufacturing costs and non-manufacturing costs in the cost formula.
- (5) Assume that you make and sell 7,800 t-shirts in the first year. Use your cost formula to calculate your first year's total cost. If you sell these t-shirts at \$15 each, how much would net profit be in the first year?

To Prepare Your Report:

Please type your answers into the report sheet posted on Blackboard. Hand-written reports will **not** be graded. The neatness of the report is one element of grading

Appendix B
 Blank Report Form for Phase One
Group Project Report–Phase One

Class Section: _____

Print and sign your name if you believe that you have contributed a fair share in this phase of the group assignment. If not, please submit a separate sheet to explain.

Print your name here	Sign your name here
(Leader)	
_____	_____
_____	_____
_____	_____

1. Your company’s name: _____

2. and 3. Detailed list and classification of costs

Please show or explain your computations in a readable/understandable format. No points will be given if no explanations are provided.

Variable Costs and Expenses

(Round your numbers to the hundredth, i.e. “\$x.xx”.)

	Cost Items	Cost Per T-Shirt
Manufacturing		
(1)	_____	_____
<i>Explanations:</i>	_____	_____
(2)	_____	_____
<i>Explanations:</i>	_____	_____
(3)	_____	_____
<i>Explanations:</i>	_____	_____
(4)	_____	_____
<i>Explanations:</i>	_____	_____
Total variable manufacturing costs per T-shirt:		_____

	Cost Items	Cost Per T-Shirt
Non-Manufacturing		
(1)	_____	_____
<i>Explanations:</i>	_____	_____

(2) _____
 Explanations: _____

(3) _____
 Explanations: _____

(4) _____
 Explanations: _____

Total variable non-manufacturing costs per T-shirt: _____

Total variable costs and expenses per T-shirt: _____

Fixed Costs and Expenses

(Round your numbers to the nearest whole dollar.)

	Cost Items	Cost Per Year
Manufacturing		

(1) _____
 Explanations: _____

(2) _____
 Explanations: _____

(3) _____
 Explanations: _____

(4) _____
 Explanations: _____

(5) _____
 Explanations: _____

Total fixed manufacturing costs per year: _____

	Cost Items	Cost Per Year
Non-Manufacturing		

(1) _____
 Explanations: _____

(2) _____
 Explanations: _____

(3) _____

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Explanations:

(4)

Explanations:

(5)

Explanations:

Total fixed non-manufacturing costs per year:

Total fixed costs and expenses per year:

4. Cost formula for manufacturing costs

Cost formula for non-manufacturing costs:

Cost formula for the T-shirt business:

(Present each cost formula in “ $Y = a + bX$ ” format.)

5. If for the first year, sales = 7,800 T-shirts, and selling price = \$15 per T-shirt:

(1) Total costs =

Explanation:

(2) Net profit =

Explanation:

Appendix C
Full Text of Phase Two Instructions
Group Project – Phase Two

Due: _____

Phase Two Requirements:

1. On your graded Phase One report, revise your answers in pencil and turn it in with your Phase Two report. (Some groups need not to revise anything.) Make sure that everything is correct. Start to prepare a clean version of your Phase One report as it will be required to turn in during Phase Three.
2. Now you have developed your cost estimates, let's do some evaluations on this proposed business.
 - a. Continue to assume that 7,800 t-shirts will be made and sold in the first year. What is your product cost per unit under absorption costing? What is your product cost per unit under variable costing?
 - b. Based on the estimated sales level of 7,800 t-shirts for the first year, prepare your company's (forecasted) income statement for the year ended on 12/31/2014 using both (1) the traditional format based on the absorption costing and (2) the contribution format based on the variable costing.
 - c. Calculate contribution margin per T-shirt and contribution margin ratio.
 - d. Calculate how many T-shirts you need to sell in order to break-even. Calculate how much sales in dollars you need to make in order to break-even. (*Use break-even formulas.*)
 - e. Calculate how many T-shirts you need to sell in order to make \$10,000 target profit for the year.
 - f. Continue to assume that 7,800 T-shirts will be made and sold during the first year. Calculate your (1) margin of safety and (2) degree of operating leverage (DOL) for your business. What do these figures tell you about how risky your business is?
 - g. If sales could increase by 1,560 shirts (i.e. a 20% increase), by how much in dollars would net operating income increase? By what percentage would net operating income increase? (*Use the "quick" way, i.e. contribution margin concept and DOL, you have learned in class to answer these questions. Do not recalculate net operating income.*)
 - h. Prepare a contribution format income statement assuming a sales increase by 20% to 9,360 shirts. Compare your new net operating income with your answer in Question "b" and prove mathematically that your answers to the two questions in Question "g" are correct.
 - i. Ignore Questions "g" and "h". If the cost per plain t-shirt is expected to increase by 20% and sales (in number of T-shirts) are expected to be 5% less, how much is your projected net operating income (or loss)?
 - j. Continue Question "i". If the only expense you can cut is the salary paid to yourselves, how much salary should you cut in order to break even?
 - k. Ignore Question "i" and "j". Assume that you have produced 7,800 t-shirts, but the actual sales for the first year turn out to be 7,000 T-shirts instead of 7,800. I.e. you will have 800 T-shirts left at the end of the first year. Prepare (1) a traditional format income statement and (2) a contribution format income statement. Are the two net operating income figures the same? Why or why not?
3. Continue "k". At what amount would inventory be reported in the balance sheet of 12/31/2014 under (1) the absorption costing and (2) variable costing? Are the two ending inventory figures the same or different? Why?

Appendix D
 Blank Report Form for Phase Two

Group Project Report–Phase Two

Class Section: _____ **Company Name:** _____

Print and sign your name if you believe that you have contributed a fair share in this phrase of group assignment. If not, please submit a separate sheet to explain.

Print your name here	Sign your name here
_____	_____
(Leader)	
_____	_____
_____	_____

1. Revise your Phase One report in pencil (if applicable) and turn it in with your Phase Two report. Make sure everything is correct.

2. Business Evaluation

a. Product cost per t-shirt under absorption costing = _____ \$
 (Round your answer to the hundredth, i.e., "\$x.xx".)

Explanations:

Product cost per t-shirt under variable costing = _____ \$
 (Round your answer to the hundredth, i.e., "\$x.xx".)

Explanations:

b. (1) Traditional format income statement (absorption costing):
 (You do not need to list each cost/expense separately. Present your numbers as whole dollars.)

(Your company's name)

Income Statement – Traditional Format

For the Year Ended 11/30/2014

Sales	\$
Less: Cost of goods sold	\$
Gross margin	\$
Less: Selling and administrative expenses	\$
Net operating income	\$

(2) Contribution format income statement (variable costing):
 (You do not need to list each cost/expense separately. Net operating income under variable costing should be the same as net operating income under absorption costing for this question because units produced are the same as units sold.) (Present your numbers as whole dollars.)

(Your company's name)

Income Statement – Contribution Format

For the Year Ended 11/30/2014

.....	\$	
Less:		
.....	\$	
.....	\$	\$
.....	\$	\$
Less:		
.....	\$	
.....	\$	\$
Net operating income	\$	\$

c. Contribution margin per t-shirt = \$ _____

(Round your answer to the hundredth, i.e., "\$x.xx".)

Explanations:

Contribution margin ratio (in %) = _____ %

(Present the ratio in percentage format and round it to the hundredth, i.e., "x.xx%").

Explanations:

d. Break-even number of t-shirts per year = _____ T-shirts

(Round your answer to the nearest whole number.)

Explanations:

Break-even sales in dollars per year = \$ _____

(Round your answer to the nearest whole number.)

Explanations:

e. Number of tee shirts needed to earn \$10,000 target profit per year = _____ T-shirts

(Round your answer to the nearest whole number.)

Explanations:

f. (1) Margin of safety (in %) = _____ %

(Present the ratio in percentage format and round it to the hundredth, i.e., "x.xx%").

Explanations:

Based on the margin of safety we calculated, we feel that our business is risky/not risky (choose one) because (answer is subjective)

(2) Degree of operating leverage = _____

(Round your answer to the tenth, i.e., "x.x".)

Explanations:

Based on the degree of operating leverage we calculated, we feel that our business is vulnerable/not vulnerable (choose one) to changes in the economy because (answer is subjective)

g. Net operating income will increase by \$ _____

(Round your number to the whole dollar.)

Explanations:

Net operating income will increase by _____ %
 (Present the ratio in percentage format and round it to the hundredth, i.e., “x.xx”).
 Explanations:

h. Contribution format Income Statement with sales = 9,360 T-shirts.
 (Present your numbers as whole dollar.)

(Your company’s name)

Income Statement – Contribution Format
 For the Year Ended 12/31/2014

.....		\$
Less:		
.....	\$	
.....	\$	\$
.....		\$
Less:		
.....	\$	
.....	\$	\$
Net operating income		\$

Net operating income when sales are 7,800 units = \$ _____
 Increase in net operating income = \$ _____ Same as in “g”? _____

Explanations:

Increase in net operating income = % _____ Same as in “g”? _____

Explanations:

i. Projected net operating income (or loss) = \$ _____
 (Round your answer to the whole dollar.)

Explanations:

j. To break-even, administrative salary should be = \$ _____
 (Round your answer to the whole dollar.)

Explanations:

k. (1) Traditional format income statement (absorption costing):
 (Present your numbers as whole dollar.)

(Your company’s name)

Income Statement – Traditional Format
 For the Year Ended 11/30/2014

Sales		\$
Less: Cost of goods sold		\$
Gross margin		\$
Less: Selling and administrative expenses		\$
Net operating income		\$

(2) Contribution format income statement (variable costing):
 (Present your numbers as whole dollar.)

(Your company's name)

Income Statement – Contribution Format
 For the Year Ended 12/31/2014

.....	\$
Less:	
.....	\$
.....	\$
.....	\$
Less:	
.....	\$
.....	\$
Net operating income	\$

The two net operating income figures are the same/different (*choose one*) because

3. (1) Under absorption costing, ending inventory at 11/30/14 = \$ _____

Explanations:

(2) Under variable costing, ending inventory at 11/20/14 = \$ _____

Explanations:

The two ending inventory figures are the same/different (*choose one*) because

Appendix E
Full Text of Phase Three Instructions

Group Project – Phase Three

Due: _____

Phase Three (Final Phase) Requirements:

1. Revise your Phase Two report (if applicable). Make sure everything is correct and is in good form. Attach a clean (unmarked and corrected) copy of your Phase One and Phase Two reports to your final phase report. The level of professionalism in the look of your final submission (including if you have followed all instructions carefully) will weigh significantly in grading. Prepare a cover page for your final group project report. The cover page should show your company's name, your class section, and your group members' names. Identify the group leader. Please type and do NOT submit your report by email.
 2. Calculate the total amount of cash you will need to have before the launching day of your business, in order to buy all necessary equipment and machines, to purchase all materials and supplies needed for the first three months' operations, and to pay your employees' first three months salaries. Assume that your parents have agreed to loan you this amount, interest free. The following is information regarding the cash payment needs for your variable costs and fixed costs:
 - a. Variable Costs and Expenses:

For every variable cost item, you decide to buy sufficient quantity for making the first 2,000 T-shirts. You also want to prepare sufficient amount of cash to pay for the labor costs needed for making, folding, and wrapping the first 2,000 T-shirts. Assume that you can pay your workers for a fraction of an hour. However, you cannot purchase a fraction of an ink-jet cartridge or a partial case or ream of paper.
 - b. Fixed Costs and Expenses:

In addition to covering variable costs for the first 2,000 T-shirts, your initial amount of cash should be sufficient to pay for the first quarter's cash needs for your fixed costs. For your fixed cost items, payments will be made according to the following pattern: (Note: The following cost item labels are according to the cost list of Phase One.)

 - a) Cost items 1), 3), and 9) will be paid on a monthly basis.
 - b) Cost items 4), 5a), and 5b) will be completely paid for on January 1st.
 - c) The first quarterly party, cost item 10), will be paid at the end of the first quarter.
 - d) Cost item 8) will not be paid until the end of the first year of operations.
3. Prepare a cash budget for your company's **first year** of operations. (NOT the first three months or the first 2,000 T-shirts!) Continue to assume that the selling price is \$15 and that 7,800 t-shirts will be made and sold in the first year. Assume all sales are cash sales and that all costs and expenses are paid in cash. Prepare cash budget for the entire year; do not separate the budget into four quarters. Your initial cash balance is the amount you reported in Item 2 above. You decide to keep a cash balance of \$20,000 at December 31, 2014 and use the extra cash, if there is, to pay back part of the loan you borrowed from your parents.
4. Calculate the first year's estimated "Simple Rate of Return" (i.e. accounting rate of return) of your business. Use the net income under the absorption costing. For simplicity, use the amount of money you originally borrowed from your parents as the amount of "initial investment" for this calculation.

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5. After reviewing the budgeted income statement (in Phase Two) and the simple rate of return for your company's first year of operations, you and your partners are disappointed at the estimated net income of \$4,422 and the low rate of return. ("After all the hard work, is that all we can make?") So you begin to discuss business strategies that you hope will help to improve profitability.
 - a. Develop a business strategy which will involve at least three changes in some (or all) of the following attributes: (1) variable cost per t-shirt, (2) total fixed cost, and (3) selling price per T-shirt. Your three (or more) changes can come in any combination of (1), (2), and (3). For instance, you could propose that you use better quality plain t-shirts as raw material (which will change (1)), increase advertising budget (which will change (2)), and then sell the t-shirts at a higher price (which will change (3)), and hope that you will be able to sell more T-shirts after adopting this strategy. Alternatively, your business strategy could be to draw the T-shirt pictures yourself instead of using the artist (which will change (2)), move your business location to a less expensive location (which will also change (2)), and lower the price (which will change (3)). Please use your imagination to come up with a more creative strategy than proposed here! (Innovative strategies will receive extra points.) Describe your strategy clearly and justify why you believe your strategy will work.
 - b. Indicate by how much your variable cost per T-shirt, total fixed cost, and selling price will change under your strategy. Revise your overall cost formula (the third formula in Phase One report item #4.) according to your strategy.
 - c. What would the new contribution margin per T-shirt be? What would the new break-even level of annual sales (in number of T-shirts) be under your strategy?
 - d. Under your strategy, how many T-shirts do you think you will be able to produce/sell in a year in the best (but realistic) scenario? How many T-shirts do you think you can produce/sell in the worst scenario? Assume that the T-shirts produced will be all sold. Calculate your net income under each of the two scenarios. (Note: Calculating net operating income would be easier using the variable costing approach. Do not hesitate to give realistic estimations. Your report grades will have nothing to do with the profitability of your business.)
6. After your thorough analyses of costs, sales, and profitability of your T-shirt business throughout the three phases of this group project, what is your overall impression of the future potential of this business? Please provide a **short** one-paragraph assessment.

Appendix F
 Blank Report Form for Phase Three

Group Project Report–Phase Three (Final Phase)

Class Section: _____ **Company Name:** _____

Print and sign your name if you believe that you have contributed a fair share in this phrase of group assignment. If not, please submit a separate sheet to explain.

Print your name here	Sign your name here
_____	_____
(Leader)	
_____	_____
_____	_____

1. Revise your Phase Two report (if applicable). Make sure everything is correct on your Phase One and Phase Two reports. Attach a clean copy of Phase One and Phase Two reports to this final report. Prepare a cover page for your submission. Staple everything together.

2. Total amount of cash needed on January 1st = \$ _____

Explanations: (Use the tables below.)

a. Cash Needed to Pay for Variable Costs of 2,000 T-Shirts: (Round your numbers to the whole dollar.)

	Cost Items	Cash Needed
(1) Direct materials (plain T-shirts)		\$
<i>Explanations:</i>		
(2) Labor cost (direct labor and folding/wrapping labor)		\$
<i>Explanations:</i>		
<i>Direct:</i>		
<i>Wrapping:</i>		
(3) Transfer paper		\$
<i>Explanations:</i>		
(4) Ink-jet cartridges (for both manufacturing and non-manufacturing purposes)		\$
<i>Explanations:</i>		
<i>Manufacturing:</i>		
<i>Non-manufacturing:</i>		
(5) Laser paper		\$
<i>Explanations:</i>		
(6) Wrapping paper and boxes		\$
<i>Explanations:</i>		
Total cash needed for variable costs		\$

b. Cash Needed to Pay for Fixed Costs During the First Quarter: (Round your numbers to the whole dollar.)

Cost Items	Cash Needed
(1) Stoneridge rental <i>Explanations:</i>	\$
(2) Storage rental <i>Explanations:</i>	\$
(3) Artist’s fees <i>Explanations:</i>	\$
(4) Computer and printer <i>Explanations:</i>	\$
(5) Heat press machine <i>Explanations:</i>	\$
(6) Liability insurance <i>Explanations:</i>	\$
(7) Quarterly party <i>Explanations:</i>	\$
Total cash needed for fixed costs	\$

3. Cash budget for the first year ended December 31, 2014.

(Your Company’s Name)

Cash Budget

For the Year Ended NovDecember 31, 2014

Cash balance, January 1, 2014	\$
Collections from customers	
Total cash available before disbursements	\$
Less disbursements: <i>Show calculations next to each cost item.</i>	
	\$
Total disbursements	
Excess of cash	
Financing:	
Repayment	
Cash balance, December 31, 2014	

Note: Don’t be too “depressed”! Cash situation might not as bad in the second year because some expenditures are not expected to incur in every year of business.

4. Simple Rate of Return = $\frac{\quad}{\quad}$ %
 (Present the ratio in percentage format and round it to the hundredth, i.e., x.xx%).
 Explanations:

5. Your Business Strategy

a. Describe your business strategy in detail and explain why you think it will work.

b. Original overall cost formula from Phase One report: _____

The impacts of your strategy:

	Original	Amount of Change (indicate + or -)	After Change
Variable cost per unit	\$ _____	_____	\$ _____
Total fixed cost	\$ _____	_____	\$ _____
Selling price	\$ _____	_____	\$ _____

New overall cost formula: _____

c. New contribution margin per t-shirt: _____

(Round your answer to the hundredth, i.e., "\$x.xx".)

Explanations:

New break-even sales: shirts _____

(Round your answer to the whole number.)

Explanations:

d. Sales (in number of t-shirts) in the best scenario: shirts _____

Net income = _____

Explanations:

Sales (in number of t-shirts) in the worst scenario: shirts _____

Net income = _____

Explanations:

6. Assessment of the business's future potential:

Appendix G
Peer Evaluation Form, Fall 2013

Peer Evaluation:

I would like each member of each group to fill out a peer evaluation form to assess each group member's efforts in this group project throughout the quarter. A student's project score might be adjusted down by an appropriate percentage at my discretion if at least half of his/her group members believe that he/she does not deserve the same score as the rest of the group members. When you evaluate your group members, please be thoughtful by focusing more on the level of efforts your group members have demonstrated, rather than their actual contributions to the project since some of your group members might not be as good at this subject as you are. Please turn in your peer evaluation form to me **individually** on or before December 5.

Appendix H
Project Evaluation Form

Fall 2013

Please fill out the following form. DO NOT write your name on the form. Please turn it in by Friday, December 6. You may turn it in during class on Dec. 3 or 5. You may turn it in by email but then it will not be anonymous. You may also leave it under my office door any time before 3 pm on Friday, Dec. 6

You have worked on a three phase project. Circle the the best answer for each question.

1. Phase One helped me understand the material from class.
Agree Agree somewhat Neutral Disagree somewhat disagree
2. Phase One helped me understand the relationship among cost concepts.
Agree Agree somewhat Neutral Disagree somewhat disagree
3. Phase One helped me understand the relationship between what we learned in class and the way businesses actually work.
Agree Agree somewhat Neutral Disagree somewhat disagree
4. Phase Two helped me understand the material from class.
Agree Agree somewhat Neutral Disagree somewhat disagree
5. Phase Two helped me understand the relationship among cost concepts.
Agree Agree somewhat Neutral Disagree somewhat disagree
6. Phase Two helped me understand the relationship between what we learned in class and the way businesses actually work.
Agree Agree somewhat Neutral Disagree somewhat disagree
7. Phase Three helped me understand the material from class.
Agree Agree somewhat Neutral Disagree somewhat disagree
8. Phase Three helped me understand the relationship among cost concepts.
Agree Agree somewhat Neutral Disagree somewhat disagree
9. Phase Three helped me understand the relationship between what we learned in class and the way businesses actually work.
Agree Agree somewhat Neutral Disagree somewhat disagree
10. We spent too much time on this project relative to other things in class
Agree Agree somewhat Neutral Disagree somewhat disagree
11. This project was a valuable learning experience
Agree Agree somewhat Neutral Disagree somewhat disagree
12. This project helped me understand the material on the tests
Agree Agree somewhat Neutral Disagree somewhat disagree
13. My teammates were helpful in working on the project
Agree Agree somewhat Neutral Disagree somewhat disagree
14. My teammates were helpful in understanding the project material and questions
Agree Agree somewhat Neutral Disagree somewhat disagree
15. After working on this project I have a better understanding of the cost considerations for a real business
Agree Agree somewhat Neutral Disagree somewhat disagree

Other comments?

Appendix I
 Results of Project Evaluations

Tally of student replies to project evaluation-- raw numbers

Question	Agree	Agree somewhat	Neutral	Disagree somewhat	Disagree	TOTAL
1	9	9	2			20
2	10	7	3			20
3	13	5	1	1		20
4	10	8	1		1	20
5	8	8	3		1	20
6	9	8	2		1	20
7	10	7	2		1	20
8	12	4	3		1	20
9	11	5	2	1	1	20
10	3	7	3	2	5	20
11	11	7	2			20
12	7	6	6		1	20
13	16	4				20
14	10	7	3			20
15	6	11	2		1	20

Tally of student replies to project evaluation--percentage of total responses

Question	Agree	Agree somewhat	Neutral	Disagree somewhat	Disagree	TOTAL
1	45%	45%	10%	0%	0%	100%
2	50%	35%	15%	0%	0%	100%
3	65%	25%	5%	5%	0%	100%
4	50%	40%	5%	0%	5%	100%
5	40%	40%	15%	0%	5%	100%
6	45%	40%	10%	0%	5%	100%
7	50%	35%	10%	0%	5%	100%
8	60%	20%	15%	0%	5%	100%
9	55%	25%	10%	5%	5%	100%
10	15%	35%	15%	10%	25%	100%
11	55%	35%	10%	0%	0%	100%
12	35%	30%	30%	0%	5%	100%
13	80%	20%	0%	0%	0%	100%
14	50%	35%	15%	0%	0%	100%
15	30%	55%	10%	0%	5%	100%