Going Postal: Analyzing Operating Income of the Wheels of Fortune

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This case reinforces managerial accounting concepts, provides an active learning environment, and fosters soft skill development. Students quantify and analyze the impact changes in sales mix and manufacturing variances have on operating income. Supported by their calculations, students provide, in a professional memorandum, short and long-term recommendations for improvement. Feedback from 107 undergraduate and graduate students enrolled in managerial and cost accounting courses demonstrate case effectiveness in reinforcing the knowledge, comprehension, application, and synthesis of managerial accounting concepts. In addition, the case requirements foster soft skill (e.g. critical thinking & decision making skills) development and information technology proficiency.

INTRODUCTION

Most business students lack exposure, knowledge and understanding gained from working in business settings where financial information is collected, analyzed, and used for decision-making purposes. This deficiency creates a challenging situation for students enrolled in managerial accounting courses who have not fully developed critical thinking skills, synthesis and analysis proficiency, and judgment and decision-making skills. Students are often not interested in the content of managerial accounting because they cannot envision the relevance or applicability of the course material to their professional careers. Further, most students enrolled in managerial accounting are completing the course as part of a degree requirement rather than for personal enrichment and interest. Managerial accounting instructors should embrace this challenge by developing effective and interesting methods to engage students and promote learning. In addition, their methods must satisfy the current generation's expectations of a nurturing environment that incorporates technology, real-world examples, teamwork, and captures their short attention spans (Monaco & Martin, 2007; Stewart K. , 2009; Merlino & Rhodes, 2012).

Research on effective classroom techniques support the use of teaching cases as means of providing an active learning environment, allowing students to apply knowledge (Lynch, 2008; Paolini, 2015), and bridging the gap between the classroom and the professional world (Milne & McConnell, 2001). However, today's graduates require more than the discipline-based knowledge traditionally derived from college courses. Higher education business courses need to incorporate soft skill development and assignments to foster critical thinking and judgment and decision making skills to better prepare graduates for the professional world (Boyce, Williams, Kelly, & Yee, 2001; De Villiers, 2010). This case meets the

challenge by integrating quantitative and qualitative managerial accounting concepts in a simulated real-world business setting to meet the expectations of current students, provide an active learning environment, and bridge the gap between the classroom and professional world.

Specifically, this case study requires students to apply managerial accounting concepts to calculate the impact of sales mix and manufacturing variances on the operating income for a bicycle assembly and marketing company. Supported by their calculations, students analyze the potential root causes for the reduction in operating income and write a professional memorandum to the company's management team providing short and long-term recommendations to improve operating income. This case can be modified for use in a spectrum of undergraduate and graduate managerial and cost accounting courses and can be assigned as a team project or an individual assignment.

Feedback from 107 students enrolled in introductory managerial accounting, cost accounting, and graduate-level managerial accounting courses across the United States provides evidence that the case is effective in reinforcing the understanding, comprehension, and application of managerial accounting concepts, and effectively promotes the analysis, synthesis, and evaluation of a business entity. In addition, soft skills (e.g. critical thinking, judgment & decision-making skills) and technological skills are developed by the use of electronic spreadsheets for calculations and schedules and word processors for professional memorandums detailing short and long term recommendations.

LITERATURE REVIEW

Managerial Accounting Courses

Research shows that interest in subject matter and material relatability are key contributors to student success (Paolini, 2015). Students that are engaged are more likely to be successful. Students enrolling in managerial accounting courses (introductory, cost, & graduate-level) may be uncertain how the course is relevant to their future and may have little interest in accounting in general due to their limited experience. Additionally, studies show aptitude, effort, previous exposure to and experience in accounting or bookkeeping positively impacts a student's performance in principles of accounting courses (Eskew & Faley, 1988; Baldwin & Howe, 1982; Bartlett, Peel, & Pendlebury, 1993). Students with high GPAs or those who have been exposed to accounting in high school or in their professional careers are more likely to be successful than others. Alternatively, Doran et al. (1991) finds previous exposure to accounting in high school negatively impacts performance in introductory managerial accounting courses. These results are likely due to the emphasis on critical thinking and judgment and decision making in managerial accounting courses rather than rote memorization of material more prevalent in principles of financial accounting. To identify factors that contribute specifically to the success of managerial accounting students, Al-Twaijry (2010) examines 312 students enrolled in managerial accounting, cost accounting, and advanced managerial accounting courses and finds performance is positively impacted by aptitude and general undergraduate academic capability. However, in many colleges and universities, enrollment in managerial accounting courses, particularly introductory courses, is not based on aptitude or general academic capability. Enrollment is determined by the requirements of a degree plan. The combination of students having limited interest, experience, and a range of aptitudes and academic capabilities creates a challenge for instructors to provide a learning environment that conveys the relevance of managerial accounting and maintains students' attention without compromising content and rigor.

Student Generational Impacts

Most current college students were born between the years 1994 – 2001 and are categorized as Generation Y or Millennials. Their distinctive upbringings significantly impact their college and professional expectations. Studies acknowledge that older, traditional teaching methods (e.g. lecture-driven courses) are not effective with Millennials because they prefer an active learning environment (Matherly & Burney, 2013; Phillips & Trainor, 2014; Blair, Maharaj, & Primus, 2016). In addition, McGlynn (2005); and Monaco and Martin (2007) determined that the over nurturing of this generation resulted in them entering college with the same expectations from their courses and instructors. Monaco

and Martin (2007) suggest that, while millennials are confident and achieving, they feel pressured to perform at high levels; therefore, they suggest using classroom approaches such as an interactive learning environment (e.g. teaching cases), clearly defined paths for success, immediate feedback, integration of various forms of technology, and real life applications. Further, Merlino and Rhodes (2012) examine this group as a means of identifying ways to improve teaching and learning and show the millennial generation favor the use of technology, are multi-taskers with short attention spans, among other characteristics.

Use of Case Studies in the Classroom

Milne and McConnell (2001) recommend educators implement problem-based studies requiring students to define their understanding of a problem, to generate solutions, and recommend a solution to help "bridge the gap" between higher education and professional careers. Proponents of using teaching studies in the classroom found they benefit students and enhance learning in general (Wilson, 1988; Libby, 1991; Stewart & Dougherty, 1993; Boyce G. , 1994; Wines, Carnegie, Boyce, & Gibson, 1994; Stout, 1996). However, studies acknowledge that contemporary college graduates require more than technical and discipline-based knowledge from managerial accounting courses to be successful in their professional careers (Braun, 2004; Kavanagh & Drennan, 2008).

Studies highlight the need for emphasis on soft skill development along with discipline-specific skills (Boyce, Williams, Kelly, & Yee, 2001). Soft skills include "communication and interpersonal skills, problem-solving skills, conceptual/analytical and critical skills, and judgment and synthesis skills" (Boyce, Williams, Kelly, & Yee, 2001).

Teaching cases are shown to promote active learning and demonstrate that they advance and develop problem-solving, analytical and critical thinking, and judgment and synthesis skills in accounting students (Meyers & Jones, 1993; Boyce, Williams, Kelly, & Yee, 2001; Fink, 2013). Weil et al. (2001) examined students' perceptions of teaching cases employed in the classroom and find college students believe teaching cases expose them to real-world complexities and enhance decision making and thinking skills.

Based on the current literature, the authors develop a teaching case to bridge the gap between classroom content and the professional business world to enhance the dissemination of managerial accounting concepts and foster soft skill development. This case simulates a real-world business setting and promotes active learning of managerial accounting concepts by incorporating real-world examples, providing clear instructions and structure, and incorporating technology. This case can be easily modified for use in a spectrum of managerial accounting courses such as introductory managerial accounting, cost accounting, and graduate managerial accounting courses.

METHODOLOGY

This case was assigned to undergraduate business majors, accounting majors, and graduate students at multiple public and private universities located in the Midwest, Southwest and West over multiple semesters as an end-of-semester project. The case was assigned in the last 4-5 weeks of class with students having 1-2 weeks to complete it. Students worked independently to complete the case by submitting an Excel® spreadsheet containing their calculations and written responses to case questions.

CASE MATERIAL

The Decision

It was a beautiful Saturday morning as Lance completed his ride in the hill country of central Texas. During his ride Lance thought, "What has caused the operating income of Wheels of Fortune to decline so drastically over the last year?" He was concerned that if the trend persisted, Wheels of Fortune, the bicycle assembly and wholesale company he started ten years ago, would cease to exist.

From the beginning, Wheels of Fortune was Lance's brainchild. At forty, after surviving a significant health scare, Lance realized his professional cycling career was nearing an end. Yet, he wanted to stay

connected to the cycling community he so dearly loved. He reasoned his years of professional cycling experience for the Postal team and firsthand knowledge of the deficiencies in existing bicycle technology uniquely qualified him to build a better bicycle.

During a ride after another grueling season, Lance mentioned his idea for Wheels of Fortune to his long-time training partners and best friends, Tyler and Sam. "Last week, after Sheryl told me she is expecting our first child and I decided to retire."

Tyler a bit surprised asked, "I knew you were tiring of the professional circuit, but I didn't think you were ready to retire. What's next for you?"

Lance replied, "I'm going to start a bicycle company called Wheels of Fortune. The company will assemble bicycles to order from retailers. I know it is sudden, but I would like for you and Sam to be my partners. With your knowledge of bicycle assembly and technology, Sam's accounting and procurement acumen, and my sales and marketing appeal, we would form an unbeatable team just like we did on the circuit."

The Challenge

"Who called this meeting?" a slightly annoyed Tyler queried.

"I did," Lance replied. "My apologies, I know how much we all hate meetings, but it could not be helped. Our operating income decreased drastically in the last year. At this rate, we won't be in business much longer if we can't figure out what happened. I asked Sam to generate a comparison of operating income for the past two years."

Sam explained, "Our operating income decreased over $4 million in just one year even though we sold the same number of bicycles. Over the same period, our contribution margin per bicycle decreased by almost a $1,000. While the average variable cost per bicycle decreased significantly, it was not enough to offset the decrease in our average selling price per bicycle."

TABLE 1
COMPARATIVE OPERATING INCOME STATEMENTS

Wheels of Fortune Operating Income Statement				
Bicycles Sold	4,500		4,500	
	2016	**Per Bicycle**	**2017**	**Per Bicycle**
Sales Dollars	$ 18,675,000	$4,150.00	$ 10,575,000	$2,350.00
Direct Material Costs	$ 10,260,000	$2,280.00	$ 6,688,000	$1,486.22
Direct Labor Costs	1,503,000	334.00	1,473,120	327.36
Variable Overhead	540,000	120.00	447,750	99.50
Total Variable Costs	$ 12,303,000	$ 2,734.00	$ 8,608,870	$ 1,913.08
Contribution Margin	***$ 6,372,000***	***$1,416.00***	***$ 1,966,130***	***$436.92***
Contribution Margin Percent	34.12%		18.59%	
Selling & General Administration	$ 615,000	136.67	$ 765,000	170.00
Operating Income	$ 5,757,000	$1,279.33	$ 1,201,130	$266.92

Lance interrupted, "We have always sold professional bicycles for $5,500 and Novice for $1,000. How is it possible for our average sales price to decrease so drastically in one year without a price reduction?"

Sam replied, "That's an excellent question and I thought the same. Our accounting records show that, while we continue to produce and sell at capacity of 4,500 bicycles, our sales mix shifted drastically. In prior years, 70 percent of total sales were generated from Professional bicycles. However, this year, 70

percent of sales are coming from Novice bicycles. The demand for Professional bicycles has decreased with a corresponding for Novice models."

"We've been assembling the same top-of-the-line Professional bicycle for ten years. How is it possible that sales shifted so drastically?" Tyler asked.

Sam suggested somewhat sarcastically, "Perhaps, our Professional bicycles are no longer considered top-of-the-line."

Lance sensing Tyler was a little put off chimed in, "So you are saying the shift in sales mix is the reason for our decreased operating income?"

"You are partially correct. The shift in sales mix impacted our average selling price. However, other factors contributed to the decrease in our operating income and need to be quantified. Specifically, we need to analyze our variable manufacturing and fixed selling and general administration costs," Sam appraised.

"Okay. So, you are suggesting we have the data to analyze those costs?" Tyler asked hopefully.

"Yes; however, analyzing our variable manufacturing costs is much more complex than analyzing sales. We need to begin by comparing our expected or standard costs to assemble a bicycle with the actual cost to calculate manufacturing variances. Analyzing manufacturing variances will provide insight about spending and the efficiency of our assembly process," Sam explained. "When we started the company, we used the following assumptions to generate standard costs and establish selling prices."

TABLE 2
SUMMARY OF STANDARD COST INPUTS

Wheels of Fortune **Summary of Standard Costs**		
Summary of Standard Costs	**Professional**	**Novice**
Bicycle Kit per unit	$ 3,000	$ 600
Direct labor hours per bicycle	10	6
Direct labor rate per hour	$ 40	$ 30
Variable overhead rate per bicycle	$ 150	$ 50

"So, the direct labor and variable overhead costs are the expected conversion costs to assemble the bicycle kits (direct materials) into a bicycle?" Tyler asked.

Sam replied, "Correct. You will notice the direct labor to assemble Professional bicycles is more than double Novice bicycles. Because the frames and parts are so expensive on Professional bicycles, we decided to assign our most experienced assemblers to that department. In addition, as sales of our Novice bicycles increased, we were forced to transfer idle Professional assemblers to the Novice line to keep up with demand."

Tyler added, "This is the first I've seen this. I am not certain how those changes impact our direct labor costs."

"Calculating manufacturing variances can help us determine the dollar impact of those changes and others have on our variable manufacturing costs," Sam affirmed, "I summarized the relevant direct material, direct labor, and variable manufacturing overhead costs in this table. The table shows the actual number of bicycle kits, direct labor hours, and variable overhead costs incurred to assemble 4,500 bicycles last year."

TABLE 3
SUMMARY OF ACTUAL COSTS FOR 2017

Wheels of Fortune Summary of Actual Costs		
Professional		**2017**
Bicycle Kit:	Used	1,400
	Price per kit	$ 3,200
Direct labor hours		15,525
Direct labor rate per hour		$ 44
Variable overhead per bicycle		$ 180
Novice		**2017**
Bicycle Kit:	Used	3,200
	Price per kit	$ 690
Direct labor hours		20,790
Direct labor rate per hour		$ 38
Variable overhead per bicycle		$ 65

After reviewing the information, Tyler replied, "It appears you have been keeping track of our actual costs for some time. How come we never calculated manufacturing variances before?"

Sam responded, "There was no need. For the first nine years of Wheels of Fortune, the company consistently generated $6 million in operating income. However, now we need to analyze everything including the $150,000 in raises we gave ourselves last year."

A concerned Lance asked Sam, "Can you analyze our operating income, so we can make changes? If the trend continues, I might need to be forced to go back to the Postal team and I'm too old and out of shape for that."

Sam enthusiastically replied, "Absolutely."

REQUIREMENTS

Respond to the following Case Discussion Questions as if you were Sam, the accountant for Wheels of Fortune.

Case Discussion Questions

1. What are your initial observations of the potential causes of the decrease in operating income from 2016 to 2017?
2. Impact on operating income: Generate the following schedules to quantify the impact on decrease in operating incoming from 2016 to 2017 for Wheels of Fortune.
    a. Standard variable cost and contribution margin per bicycle (percent & dollars): Utilizing the standard cost components and the selling price per bicycle, calculate the standard variable cost and contribution margin per bicycle at standard.
    b. Sales mix impact: Analyze the impact of the shift in sales mix by determining the sales mix variance between 2016 and 2017.
    c. Manufacturing variance impact: Calculate direct materials (price & usage), direct labor (rate & efficiency), and variable overhead variance for 2017.
    d. Selling and general administration impact: Prepare an analysis of the impact the increase in selling and administration costs on Wheels of Fortune 2017 operating income.
    e. Operating income reconciliation: Prepare a schedule reconciling operating income from 2016 to 2017 integrating your calculations from items b-d above.
3. Recommendations: Based on your financial analysis, generate a professional memo to the partners with your short (less than a year) and long-term (up to five years) recommendations on

how to improve the company's operating income integrating information from the schedules you created. A reader with limited financial expertise should be able to comprehend your analysis and associated recommendations.

CASE LEARNING OBJECTIVES AND IMPLEMENTATION GUIDANCE

Learning Objectives

This case details the challenges a small business is confronted with when they lose focus on operations. It affords students the opportunity to apply and extend managerial accounting principles and concepts to a practical problem many small businesses face. The case questions enhance the application of the managerial topics and illustrate the effects changes in sales mix, variable manufacturing, and administrative costs have on net operating income. Applying cost behavior knowledge, calculating sales mix, and variable manufacturing and selling and administrative variances for the company provides students with a comprehensive understanding of how managerial accounting is used in a business setting and illustrates their relevance in business decision making. The four learning objectives of the case are related to the levels of Blooms' (1956) learning taxonomy:

1. **Knowledge:** Students will recognize and identify the impact changes in sales mix, manufacturing costs, and administrative costs have on operating income.
2. **Comprehension:** Students will identify and discuss the importance of controlling key revenues and costs for sustainable operating income.
3. **Application:** Students will apply managerial accounting concepts to a quasi-real-world scenario to quantify the impact of changes in sales mix, manufacturing variances, and administrative variances on operating income.
4. **Analysis, Synthesis, and Evaluation:** Students will combine quantitative and qualitative information to analyze and evaluate potential courses of action a company may take to improve operating income. Students will provide written short and long-term recommendations improve operating income.

Implementation Guidance

This teaching case can be implemented in undergraduate managerial accounting courses (e.g. Principles of Managerial Accounting, Managerial Accounting for non-accounting majors, and Cost Accounting) and graduate managerial accounting courses to reinforce and integrate managerial topics and to develop soft skills. In undergraduate courses, it is recommend that instructors provide an initial class discussion of the case prior to assigning questions to highlight the drop in operating income when there has not been a change in the number of bicycles sold annually, manufacturing costs have decreased, and fixed selling and administrative costs have increased. Instructors should emphasize the quantitative components of the case (i.e. calculating & analyzing variances) and assign Questions 1 and 2 subsequent to covering cost behavior, sales mix, and manufacturing. Questions 1 and 2 are recommended to be assigned as a group project, rather than as an individual assignment. Groups should be comprised of three or four students for introductory managerial courses and groups of two for cost accounting courses. All groups should be instructed to read the case prior to the initial class discussion and instructors should allow time for groups to discuss and interpret key elements of the case and provide their initial observations for the change in operating income as required in Question 1. Groups should then be required to calculate all requirements from Question 2. Instructors should emphasize that the company was operating at standard prior to 2017 and there are no variances in year 2016 (figures for 2016 may be used as budgeted amount or standard). Thus, students should only calculate variances for 2017. Providing check figures and assisting groups through this portion of the case is recommended to ensure students are grasping the concepts. Once the calculations have been determined, a class discussion of the results should be conducted to ensure students understand that the cause of the change in operating income is due to the changes in sales mix and cost variances. Lastly, students should be required to individually summarize their results and recommendations in a professional memo addressed to the owners of the

company as required in Question 3. Recommendations should address the issues found in the calculations determined in Question 2 and should not include recommendations for changes in sales prices. Instructors may allow students a week or longer to complete this portion of the case. Only the Income Reconciliation Schedule needs to be graded in Question 2.

For graduate students, it is recommended that instructors assign the case as an individual assignment. Graduate students should be instructed to read the case and answer Question 1 prior to a class discussion. To facilitate a higher level of cognition, instructors may elect to focus on the qualitative components of the case (i.e. provide recommendations for action) as required by Question 3 and supported by Questions 1 & 2. For Question 2, instructors may elect to either a) provide students with the Income Reconciliation Schedule and have them work backwards to determine variances, or b) require students to determine the calculations for 2017 in Question 2 prior to answering Question 3. If students are required to complete Question 2, only the Income Reconciliation Schedule needs to be graded. Student recommendations in Question 3 should address the drop in operating income as the result of changes in sales mix and cost variances rather than recommendations of changing sales prices. Recommendations should be written in a professional letter to the owners of the company. Instructors should allow students about a week to complete this portion of the case.

This case can also be used as a semester long project. As topics are covered in an undergraduate or graduate class, instructors may require students to complete related questions and calculations from Question 2, which encompasses five individual requirements that reinforce cost behavior, and variance analysis. As the semester concludes, students should be required to submit a complete schedule of variances illustrating the impact the change in sales mix, variable manufacturing variances, and changes in administrative costs have on net operating income as required in Question 2 and prepare short and long-term recommendations as required in Question 3. The requirement in Question 3 is primarily designed for graduate courses and supports Learning Objective 4, but may also be implemented in undergraduate courses. A summary of case use suggestions in managerial courses is summarized in Table 4.

TABLE 4
SUMMARY OF CASE USE SUGGESTIONS

		Undergraduate		Graduate
Question	**Requirement**	**Intro. Managerial Acct.**	**Cost Acct.**	**Managerial Acct.**
1	Initial observation of the decreases in operating income	X	X	X
2a	Calculate standard costs and contribution margin	X	X	
2b	Calculate change sales mix and analyze effect on operating income	X	X	
2c	Calculate all variances for direct materials, direct labor, and variable manufacturing overhead	X	X	
2d	Analyze the increase Selling & Admin. expenses have on operating income	X	X	
2e	Reconcile the change in operating income using calculations from questions 2b – 2d	X	X	
3	Generate short-term and long-term recommendations to improve operating income		X	X

Lastly, for instructors wishing to integrate technology such as Excel®, standardize calculations, or focus more on the qualitative elements, a template for student use and a spreadsheet solution are available upon request from the corresponding author. Please e-mail Robert Rankin (Robert.rankin@tamuc.edu). Instructors may provide students a pre-formatted Excel® template to guide their calculations of standard cost, sales mix variance, variable manufacturing variance, selling and general administration cost increases, and the preparation of a summary schedule for year 2017. The solution spreadsheet allows instructors to customize key case inputs (e.g. dollars & units) so that it may be used in multiple class sections in the same semester or over several semesters.

These suggestions are intended to guide instructors in implementing the case into their course. In addition to the suggested solutions provided in the Appendix, we include additional questions to extend the questions presented in this case.

CLASSROOM TESTING

This case was implemented in undergraduate and graduate management and cost accounting classes at four universities located in the Midwest, Southwest and West over multiple semesters. Survey data was collected from 107 participants using five-point, Likert-type scale questions where 5 represented *"Strongly Agree,"* 3 represented *"Neither Agree or Disagree"* and 1 represented *"Strongly Disagree."* Results indicate that the case was effective in meeting Learning Objective 1 (mean = 3.84), Learning Objective 2 (mean = 4.06), Learning Objective 3 (mean = 4.04), Learning Objective 4 (mean = 4.05). Overall case effectiveness show participants perceived the teaching case was realistic, interesting, useful and they would recommend future use (mean = 3.86). As part of the survey, students provided qualitative feedback to enhance their quantitative responses to the survey. These responses and detailed results including individual class results further support case effectiveness and are available from the corresponding author.

CONCLUSION

The purpose of this case was to develop a teaching case to bridge the gap between classroom content and the professional business world to enhance the dissemination of managerial accounting concepts and foster soft skill development. The case incorporates managerial accounting concepts into a real-world business setting, promotes active learning, and encourages soft skills development such as critical thinking, analysis, judgment and decision-making skills, technology proficiency, and the development of communication skills by requiring students to calculate and analyze manufacturing variances and provide written recommendations in the form of a memorandum. Student feedback suggests the case is effective in generating interest in managerial accounting and reinforcing managerial accounting concepts.

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APPENDIX 1

Teaching Notes

For each case requirement, solutions and open-ended questions are provided to enhance learning and growth when completing case responses. Submission of all calculations and recommendations is suggested to be done electronically using spreadsheet software (e.g. Excel®) and a word processor (e.g. Word®). The memorandum should reference calculations from the spreadsheet and include tables or appendices.

In undergraduate classes, a class discussion covering Question 1 should be held prior to assigning Question 2. Once students submit responses to Question 2 (quantitative questions), another class discussion should be executed to encourage students to share their recommendations for improving operating income and to ensure they understand the causes for the change in operating income prior to making recommendations (Question 3). This method allows students the opportunity to demonstrate and develop critical thought processes.

Solutions

Question 1: Initial observations of the potential drivers and the causes for the decrease in operating income:

a. Shift or change in sales mix
   i. A higher percentage of sales of Novice bicycles with lower standard variable contribution margin decreases operating income
b. Changes in manufacturing costs
   i. Purchase price and usage of direct materials increased
   ii. Direct labor rate has increased.
   iii. Direct labor hours increased for Novice bicycles but have decreased for Professional bicycles (due to the transfer of high cost assemblers from the Professional line to the Novice line).
   iv. Despite these increases, overall manufacturing costs are lower.
c. Selling and general administration
   i. Increase in costs by $150,000 due to raises.
d. Competition
   i. Has there been an introduction of a similar bicycle by another competitor that would explain the decrease in sales of Professional bicycles?
   ii. Does a competitor offer a lower price for a similar bicycle?
   iii. Do they sell a technologically inferior product? Does the Professional bicycle the latest technology and meet customer needs?
e. Additional questions to extend Question 1.
   i. Is a technologically superior product sufficient to ensure long-term sustainability of a company?
   ii. What are the long-term implications on sustainability when non-business minded individuals operate a business?
   iii. What influence does fad or fashion have on the sales of a business?

Question 2: Impact on operating income (Schedules with overall impact are provided)

From 2016 to 2017, Wheels of Fortune experienced an operating income decrease of $4.5 million driven by a shift in sales mix, increases in variable manufacturing costs, and an increase in selling and general administration costs (instructors should emphasize that there are no variances until 2017 and that figures from 2016 may be used as the standards). With a contribution margin per bicycle difference of $1,780 from 2016 to 2017 ($1,950 vs. $170) between professional and novice bicycles (calculated in Question 2a), the sales mix shift from 70 percent professional bikes sold to 70 percent novice bikes sold from 2016 to 2017 resulted in a $3.2 million decrease (Sales Mix Variance calculated in Question 2b) in

operating income. In addition, differences between actual and standard variable manufacturing cost negatively impacted operating income by $1.2 M with direct material increasing by $748,000 ($180K usage& $568K price - Question 2c), direct labor increasing by $366,000 ($228K efficiency & $138K rate - Question 2c), and variable overhead increasing by $87,000 (Question 2c). Instructors should emphasize these variances as they are not apparent in the Operating Income Statement and are the selling point of the case. The variances illustrate the importance of variance analysis in a standard costing system. Lastly, selling and general administration expenses driven by a change in directors' salaries increased $150,000 in 2017. The solutions tables for Question 2a – 2e are provided.

a. Standard variable cost and contribution margin per bicycle (percent & dollars):

Wheels of Fortune Standard Variable Cost and Contribution Margin per Bicycle		
Direct Materials Per Bicycle		
	Professional	**Novice**
Bicycle Kit (Direct Material)	$ 3,000	$ 600
Direct Labor Cost Per Bicycle		
	Professional	**Novice**
Hours	10	6
Rate per Hour	$ 40	$ 30
Total Direct Labor Cost per Bicycle	$ 400	$ 180
Variable Overhead Cost Per Bicycle		
	Professional	**Novice**
Total Variable Overhead Cost per Bicycle	$ 150	$ 50
Total Variable Cost and Contribution Margin per Bicycle		
	Professional	**Novice**
Direct Materials	$ 3,000	$ 600
Direct Labor	$ 400	$ 180
Variable Overhead	$ 150	$ 50
Total Variable Cost per Bicycle	$ 3,550	$ 830
Selling Price per Bicycle	$ 5,500	$ 1,000
Contribution Margin per Bicycle	$ 1,950	$ 170
Contribution Margin Percent per Bicycle	35.45%	17.00%

b. Sales mix impact:

Wheels of Fortune - Sales Mix Variance			
	2017		
	Budgeted	**Actual**	**Variance**
Unit Sales - Novice	1,350	3,150	(1,800)
Contribution Margin per bicycle (Sales - DM, DL, VOH)	$ 170		
Unit Sales - Professional	3,150	1,350	1,800
Contribution Margin per bicycle (Sales - DM, DL, VOH)	$ 1,950		
Total contribution margin ((Novice Sales * Novice CM/unit) + (Prof Sales * Prof CM/Unit))	$ 6,372,000	$ 3,168,000	$ (3,204,000)

c. Manufacturing variance impact:

Wheels of Fortune Direct Materials Variance

Direct Material Standard Cost	Per Kit
Professional	$ 3,000
Novice	$ 600

Direct Materials Cost Per Unit	2017
Professional Kits	3,200
Novice Kits	690

Bicycles Assembled	2017
Professional	1,350
Novice	3,150
Total	4,500

Direct Materials Used	2017
Professional Kits	1,400
Novice Kits	3,200
Total	4,600

Direct Material Price Variance		
Total Material Price		2017
Professional	$	280,000
Novice	$	288,000
Total Direct Material Price Var	$	*568,000*

Direct Material Efficiency Variance		
Total Direct Material Usage		2017
Professional	$	150,000
Novice	$	30,000
Total Direct Material Efficiency	$	*180,000*

Total Direct Material Cost Variance			
		2017	
Professional	$	430,000	
Novice	$	318,000	
Total	$	748,000	*unfavorable*

Wheels of Fortune Direct Labor Variance

Standard Direct Labor Rates and Hours	
Standard Hours per Bicycle	
Professional	10
Novice	6
Standard Labor Rate	
Professional	$ 40
Novice	$ 30

Actual Direct Labor Rates, Hours, Dollars		
Actual Labor Rate		2017
Professional	$	44
Novice	$	38
Actual Direct Labor Hours		2017
Professional		15,525
Novice		20,790
Total Actual Dollars		2017
Professional	$	683,100
Novice	$	790,020
Total Actual Dollars	$	1,473,120

Bicycles Assembled	2017
Professional	1,350
Novice	3,150
Total	4,500

Direct Labor Rate Variance		
		2017
Professional	$	62,100
Novice	$	166,320
Total Direct Labor Rate	$	228,420

Direct Labor Efficiency Variance		
		2017
Professional	$	81,000
Novice	$	56,700
Total Labor Efficiency	$	137,700

Total Direct Labor Cost Variance			
		2017	
Professional	$	143,100	
Novice	$	223,020	
Total Direct Labor Variance	$	366,120	*Unfavorable*

Wheels of Fortune Variable Overhead Variance

Standard Variable Overhead	
Standard Variable Overhead per Bicycle	
Professional	$ 150
Novice	$ 50

Bicycles Assembled	
	2017
Professional	1,350
Novice	3,150
Total	4,500

Actual Variable Overhead	
Actual Variable Overhead per Bicycle	**2017**
Professional	$ 180
Novice	$ 65

Total Actual Variable Overhead	**2017**
Professional	$ 243,000
Novice	$ 204,750
Total Actual Variable Overhead	*$ 447,750*

Variable Overhead Variance		
Variable Overhead Variance	**2017**	
Professional	$ 40,500	
Novice	$ 47,250	
Total Variable Overhead Variance	*$ 87,750*	*Unfavorable*

d. Selling and general administration impact:

Wheels of Fortune Selling & General Admin Variance

Actual Selling & General Administration		
Actual Selling & General Administration	**2016**	**2017**
Fixed Selling & Administration	$ 615,000	$ 765,000
Total Actual Selling & General Admin	$ 615,000	$ 765,000

Selling & General Admin Variances		
	2017	
Director Salaries	$ (150,000)	
Total Selling & General Admin Variances	$ (150,000)	*unfavorable*

e. Operating income reconciliation:

Wheels of Fortune
Income Reconciliation
2016 to 2017

		Difference
Operating Income 2016		$ 5,757,000
Total Sales Mix Variance *(from 2b)*		(3,204,000)
Manufacturing Variances:		
Direct Materials Variance (from 2c)		
Price	$ (568,000)	
Efficiency	(180,000)	
Direct Labor Variance (from 2c)		
Rate	(228,420)	
Efficiency	(137,700)	
Variable Overhead Variance (from 2c)		
Spending	(87,750)	
Total Manufacturing Variances		$ (1,201,870)
Selling & General Administration *(from 2d)*		(150,000)
Operating Income 2017		**$ 1,201,130**

a. *Additional questions to extend Question 2.*
   i. Can students see the importance of variance analysis in a standard costing system?
   ii. How important is the timeliness and consistency of management accounting reporting and analysis to the operational managers of a business?
   iii. Even though not required by management, what is the management accountant's duty to report and analyze a company's operating results?
   iv. Discuss the importance of integrating internal management accounting reporting with external competitive information.

Question 3: Recommendations

Since the company is assembling bicycles at capacity, the two most prominent strategies Wheels of Fortune can elect to pursue are cost leadership and product differentiation. The cost leadership strategy presumes the company is content with not selling top-of-the-line Professional bicycles, but will continue to sell a higher percentage of Novice bicycles. To implement this strategy, the entire Wheels of Fortune management team will need to focus on cost reduction. Activities may include reducing the number of employees, lowering wages of the remaining employees, assembling bicycles more efficiently, and negotiating supplier contracts. If the company sells at the current mix of 70 percent Novice and 30 percent Professional bicycle, eliminates all manufacturing variances ($1.2M unfavorable) and the Directors pay raise ($150,000), the maximum profit potential from the cost reduction strategy would yield a potential profit of only $2.3 million, which would be well short of their target profitability of $5.7 million.

Employing a product differentiation strategy would also require the elimination of manufacturing variances, but would include strategies to shift the sales mix from selling Novice bicycles (lower contribution margin per bicycle of $170 and 17% of sales) to selling Professional bicycles (contribution margin per bicycle of $1,950 and 35% of sales). The product differentiation strategy is consistent with the makeup of three former ultracompetitive former professional cyclists; when challenged by competitors on the professional circuit, they responded with fervor to regain their competitive advantage. Their response as managers of Wheels of Fortune would be no different. These short run recommendations (cost leadership) are designed to reduce or eliminate manufacturing variances and identify the root cause of the shift in sales. The long run recommendations (product differentiation) are consistent with Wheels of Fortune regaining a market leadership position with a technologically superior Professional bicycle.

In addition to cost leadership and product differentiation, Wheels of Fortune must also address the shift in sales mix and the increases in manufacturing and selling and general administrative costs. Since Wheels of Fortune is assembling bicycles at capacity, to increase operating income, the company must shift sales from Novice bicycles with a contribution margin per bicycle of $170 (17 % of sales) to Professional bicycles with a contribution margin per bicycle of $1,950 (35 % of sales). To accomplish this, they must identify the root cause(s) of the sales mix shift, which may be due to competitor pricing and technological obsolescence of the Professional model. Perhaps a competitor is offering a similar bicycle for a lower price. To address competitors' pricing on comparable professional bicycles, the company might consider decreasing the selling price of Professional bicycles with the expectation of regaining market share; however, the short run implication would be a decrease in operating income. The shift in sales mix may be the result of the Professional bicycle becoming technologically obsolete. If technological obsolescence is determined to be the issue, the company should consider modifying their Professional bicycle with low cost, high impact easily adoptable technological innovations. Lastly, the management team (Lance, Tyler & Sam) should consider increasing their marketing presence and visibility through "celebrity" appearances at professional cycling events to promote their Professional bicycle and may consider sponsoring a professional Wheels of Fortune team.

Increases in manufacturing and selling and general administrative costs are due to standard manufacturing costs not being achieved and because administrative costs have increased. The company must focus on eliminating all unfavorable variances. Specifically, direct materials and direct labor costs exceed standard costs. The direct materials (bicycle kits) variances consist of both purchase price ($568K) and usage ($180K) variances. It is recommended that Wheels of Fortune renegotiate direct materials

supply agreements to reduce or eliminate the purchase price variance. Prior to renegotiation, the company must determine if the root cause of direct material usage variances was resulted from the quality of direct materials or issues in the assembly process. Quality issues need to be addressed during renegotiation with suppliers. For assembly process issues, corrective action needs to be implemented in the assembly facility. With unfavorable direct labor variances of $366K ($138K rate & $228K efficiency), the company needs to take immediate corrective action. With the increase in the volume of Novice bicycles, the company was forced, out of necessity, to transfer higher paid Professional line assemblers to the Novice line causing unfavorable labor rate variances. It is recommended that the company pay all Novice bicycle assemblers the same rate including those transferred from the Professional line. While this may cause strife for the Professional assemblers, it is essential for the long-term sustainability of the company. Similarly, direct labor efficiency variances negatively impacted operating income. To address the issue, the company must determine why it is taking longer to assemble Novice bicycles. If Professional assemblers are taking longer to assemble Novice bicycles, it may be a sign they are displeased with their assigned work. Management must discuss and correct the issue with them. However, if the direct labor efficiency variance is driven by new hires, the company might consider a longer training program for them.

These short run recommendations are based on minimizing any additional shift in sales from Professional to Novice bicycles and efficiently assembling bicycles. Short run cost reduction recommendations will position the company for long-term profitability, which will return the company to previous operating income. The company should consider re-designing and re-introducing their Professional bicycle with technological enhancements, revisiting the pricing of the Professional bicycle relative to competitors, and increase marketing efforts by leveraging the "brand" recognition of Lance's former Postal team members. Long run recommendations presume that Wheels of Fortune desires to regain a market leader position for Professional bicycles. To determine a long run course of action, the company must identify the root cause of the shift from Professional to Novice bicycles, which include the possibility of a technologically superior product being introduced in the market, lower pricing of competitors' products, and a lack of marketing.

a. Additional questions to extend Question 3.

i. How does the makeup of a company's management team inform and impact strategic decision-making?

ii. What are some low-cost alternatives to increase marketing?

iii. How important is market intelligence to maintaining a competitive advantage?