

Rodeo in the Classroom: Activity Based Costing Simulation

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This paper describes a classroom Activity Based Costing simulation called Rodeo in the Classroom. This simulation has been used in several introductory managerial accounting and cost accounting courses in order to help students understand the difference in the application of overhead between Job Order Costing and Activity Based Costing methods. Each student is assigned their own rodeo simulation and must calculate its cost using specific cost drivers. To verify their calculations, students with the same rodeos are grouped together to compare costs. Final rodeo costs are presented to the class where differences in cost allocations and reasons for these differences are discussed.

INTRODUCTION

Introductory managerial accounting courses present a challenge to students and faculty as they differ substantially from the previous introductory financial accounting classes that most students have already taken. Although managerial accounting requires prior knowledge of journal entries and their effect on the financial statements, it diverges from external reporting to an internal allocation of costs. It is important for students to understand how these costs are distributed among different products, as this information is vital not only to accounting majors, but across numerous business disciplines such as marketing, management, economics, and finance. This paper describes an Activity Based Costing Rodeo simulation that promotes understanding of this topic, while also comparing it to the more traditional job order costing allocation.

Data retrieved from a pre-activity/post-activity assignment suggests that this simulation helped students effectively comprehend assigning costs using activity based cost drivers. Upon completion of the project, instructors also noticed increased confidence among students within groups, as they explained their allocation numbers to each other in order to create a group consensus.

The remainder of this paper is organized as follows. First, the Activity Based Costing Rodeo simulation is described. Second, learning objectives along with guidance on simulation implementation is discussed. Third, verification supporting efficacy of the ABC Rodeo simulation is considered.

ACTIVITY BASED COSTING SIMULATION – RODEO IN THE CLASSROOM

Students often have difficulty understanding differences between Traditional Costing and Activity Based Costing in Managerial Accounting classes. Most introductory managerial accounting textbooks

initially teach job order costing to assign direct materials, direct labor, and to apply manufacturing overhead costs to products. Subsequently, activity based costing is usually introduced to allocate the same costs to products, with different results. Often, confusion results when multiple cost pools and cost drivers are presented. In order to increase understanding of the differences between allocating Manufacturing Overhead based on only one cost driver in job order costing, versus several different cost drivers within differing cost pools in activity based costing, this rodeo simulation lets students run a rodeo company within the classroom and calculate costs of operations.

To introduce the activity, students are informed that they are working for a Rodeo Company that sets up and organizes rodeo events across the country. Some of these rodeos are large and some are small, while others fall somewhere in between. Each student is expected to assign materials, labor, and overhead costs to their specific rodeo. The structure of the activity begins when students are each given sealed bags containing different small toy items which represent costs associated with their rodeo. Each student's sealed bag contains different numbers of spiders, wiggly eyes, windmills, trucks, tools, etc. These represent Overhead costs. The bags also contain small plastic people, representative of Direct Labor hours, and Hats, Boots, and Horseshoes indicating Direct Materials.

Students are given Worksheet 1 (see Appendix A) where they must count and calculate the cost of their particular rodeo, combining direct materials, direct labor, and overhead costs, using Direct Labor hours as the only cost driver in order to simulate a traditional costing method.

Once students complete the traditional cost calculations, a new worksheet is used to count and compute costs of their rodeo using specific cost pools and cost drivers indicated in Worksheet 2 (see Appendix B), for Activity Based Costing.

In order to emphasize the differences in assigning overhead between the two methods, direct materials and direct labor costs are intentionally the same for all student's rodeos using both methods. Only the Overhead applied will vary. Students must calculate the correct total cost using each method before the simulation is considered complete. Bags are coded in order to check each student to determine if correct costs were calculated. At the conclusion of this Activity Based Costing Simulation, students meet in groups determined by the codes on their sealed rodeo bags. They compare costs to see if their calculations match, and must reconcile any differences.

Once each group agrees on the final cost of their rodeo using Activity Based Costing, the instructor writes each group's total cost on the board at the front of the room, and queries the class to explain why the total dollar amounts were different between rodeos. To enhance the classroom experience, project points are assigned for student completion of the activity. By combining individualized instruction with group learning simulations, we believe students will gain a greater understanding of difficult Managerial Accounting concepts.

LEARNING OBJECTIVES AND SIMULATION IMPLEMENTATION

Learning Objectives

The Activity Based Costing simulation provides three specific learning objectives. The first objective reinforces the application of overhead to a production process by using a kinesthetic learning tool. Requiring students to count actual toy items to simulate direct labor hours or overhead cost drivers strengthens student understanding of how these costs are applied.

The second learning objective is to enhance student comprehension of the differences between the traditional costing method using one cost driver to assign overhead, and the activity based costing method using several cost drivers and cost pools to allocate the same overhead. Realization that the same product can have different costs depending on the system used to assign these expenditures has a dramatic impact on student perception of product costs.

Finally, students gain awareness of the importance of choosing appropriate cost drivers for specific cost pools. Through group and class discussion toward the end of the simulation, students realize that volume based cost drivers, such as direct labor hours, may not be appropriate for assigning certain costs,

such as utilities or safety testing. The student's perception that management's choice of cost drivers to allocate overhead directly affects the cost of the product becomes more tangible.

Implementation Guidance

Courses

This simulation was designed for an introductory managerial accounting course, which is normally the second accounting class that a college business student will take, after introductory financial accounting. It has been implemented in medium to large classes of up to 70 students. Students attending these courses include accounting, economics, finance, management, marketing, and general business majors. In addition, the project has been used as a review tool for Cost Accounting classes.

This project simulation is normally presented in class following the Job Order costing and Activity Based costing chapter lectures. The project's strategic placement at this point in the course reinforces overhead cost allocation methods, while highlighting the basic differences between the two methods. Project points are included within the overall points awarded during the semester for the class, in order to persuade students to attend and participate.

Materials

The materials required to construct the rodeo bags for the students are listed below in Table 1. Completion time for assembling the bags is approximately eight to ten hours. Students should be instructed not to open the bags during the project in order for the bags to be able to be used for future classes. Materials cost is approximately \$60.00

**TABLE 1
LIST OF MATERIALS**

| |
|--|
| Bag sealer |
| Bags |
| Small toy items including: hats, boots, horseshoes, people, trucks, windmills, spiders, raccoons, wiggly eyes, sheriff stars, tools, horses, bulls |

**FIGURE 1
EXAMPLE OF RODEO BAG (FRONT AND BACK)**



In-Class Implementation

The project takes approximately one hour of class time to complete. In order to create variation among students within the classroom and control project simulation outcomes, seven different bag combinations for overhead cost drivers were established and created. Table 2 below depicts the arrangements that were used in the different bags. Bags were coded with their particular Combo number in order to group students and verify student answers at the end of the project.

**TABLE 2
LIST OF MATERIALS**

| Combo # | Spiders | Raccoons | Wiggly Eyes | Trucks | Windmills | Stars | Tools | Horses | Bulls |
|---------|---------|----------|-------------|--------|-----------|-------|-------|--------|-------|
| 1 | 3 | 1 | 4 | 2 | 1 | 1 | 4 | 3 | 1 |
| 2 | 4 | 2 | 5 | 3 | 2 | 2 | 5 | 4 | 2 |
| 3 | 5 | 3 | 6 | 4 | 3 | 3 | 6 | 5 | 1 |
| 4 | 6 | 4 | 7 | 5 | 4 | 4 | 7 | 6 | 2 |
| 5 | 7 | 4 | 8 | 6 | 5 | 3 | 8 | 7 | 1 |
| 6 | 8 | 3 | 9 | 4 | 2 | 2 | 9 | 8 | 2 |
| 7 | 9 | 2 | 10 | 3 | 3 | 1 | 10 | 9 | 1 |

Evidence of Efficacy

This project simulation was used in six different introductory managerial accounting classes taught by three different accounting instructors over a period of two semesters. To determine effectiveness of the project, students were assigned a pre-simulation and post-simulation Activity Based Costing homework assignment. Both of the homework assignments were given after the initial Job Order costing and Activity Based costing chapter material was presented during lectures.

The pre-simulation and post-simulation assignments were identical except for the fact that they were designated algorithmic so that students must calculate different answers each time they attempted the problems. In all classes, the average increase in assignment scores was 20% between the pre and post-simulation homework problems. These results suggest significant improvement in student understanding of Activity Based Costing methods and applications as a result of this project simulation.

APPENDIX A

WORKSHEET 1

Traditional Costing

Step 1: Calculate the single predetermined overhead rate using DL hours as your cost driver.

| Overhead Cost Pool (Cost Driver) | Total Estimated Costs | Total Estimated Cost Driver |
|----------------------------------|-----------------------|-----------------------------|
| Bug Control (spiders) | \$500,000 | 100,000 |
| Rodent Control (raccoons) | \$100,000 | 10,000 |
| Safety Testing (wiggly eyes) | \$2,000,000 | 250,000 |
| Transportation (trucks) | \$1,000,000 | 40,000 |
| Utilities (windmills) | \$1,500,000 | 15,000 |
| Security (sheriff stars) | \$300,000 | 20,000 |
| Maintenance (tools) | \$150,000 | 75,000 |
| Trainers (horses) | \$400,000 | 25,000 |
| Bull Rentals (bulls) | \$2,500,000 | 12,500 |
| Total Estimated Overhead | \$8,450,000 | |
| Total Estimated DL hours | 42,250 | |

Step 2: Count the actual amount of cost driver in your bag. (Hint: The number of people in your bag represents the total number of DL hours.)

Step 3: Calculate the total overhead applied to your rodeo.

Step 4: Calculate the total cost of your rodeo.

| Direct Materials | | | | Direct Labor | | | OH Applied |
|------------------|--------|---------------|------------|------------------|-----------------|------------|---------------|
| Material | Amount | Cost per unit | Total cost | Number of People | Cost per person | Total Cost | (from Step 3) |
| Hats | | \$50 | | | \$100 | | |
| Boots | | \$100 | | | | | |
| Horseshoes | | \$30 | | | | | |
| Total DM Cost | | | | | | | |

Total Cost of your Rodeo:

Total DM Cost: \$ _____
 Total DL Cost: \$ _____
 Total OH Applied: \$ _____
 Total Cost of Rodeo: \$ _____

APPENDIX B

WORKSHEET 2

ABC Costing

Step 1: Calculate the OH Rate for each cost pool.

| Overhead Cost Pool (Cost Driver) | Total Estimated Costs | Total Estimated Cost Driver | OH Rate |
|----------------------------------|-----------------------|-----------------------------|---------|
| Bug Control (spiders) | \$500,000 | 100,000 | |
| Rodent Control (raccoons) | \$100,000 | 10,000 | |
| Safety Testing (wiggly eyes) | \$2,000,000 | 250,000 | |
| Transportation (trucks) | \$1,000,000 | 40,000 | |
| Utilities (windmills) | \$1,500,000 | 15,000 | |
| Security (sheriff stars) | \$300,000 | 20,000 | |
| Maintenance (tools) | \$150,000 | 75,000 | |
| Trainers (horses) | \$400,000 | 25,000 | |
| Bull Rentals (bulls) | \$2,500,000 | 12,500 | |
| Total Estimated Overhead | \$8,450,000 | | |
| Total Estimated DL hours | | | |

Step 2: Count the actual amount of cost driver in your bag.

| Cost Driver | # in your bag |
|---------------|---------------|
| Spiders | |
| Raccoons | |
| Wiggly eyes | |
| Trucks | |
| Windmills | |
| Sheriff stars | |
| Tools | |
| Horses | |
| Bulls | |

Step 3: Calculate the total overhead applied to your rodeo.

| Overhead Cost Pool (Cost Driver) | OH Rate | Applied OH |
|----------------------------------|---------|------------|
| Bug Control (spiders) | | |
| Rodent Control (raccoons) | | |
| Safety Testing (wiggly eyes) | | |
| Transportation (trucks) | | |
| Utilities (windmills) | | |
| Security (sheriff stars) | | |
| Maintenance (tools) | | |
| Trainers (horses) | | |
| Bull Rentals (bulls) | | |
| Total Applied OH | | |

Step 4: Calculate the total cost of your rodeo.

| Direct Materials | | | | Direct Labor | | | OH Applied |
|------------------|--------|---------------|------------|------------------|-----------------|------------|---------------|
| Material | Amount | Cost per unit | Total cost | Number of People | Cost per person | Total Cost | (from Step 3) |
| Hats | | \$50 | | | \$100 | | |
| Boots | | \$100 | | | | | |
| Horseshoes | | \$30 | | | | | |
| Total DM Cost | | | | | | | |

Total Cost of your Rodeo:

Total DM Cost: \$ _____

Total DL Cost: \$ _____

Total OH Applied: \$ _____

Total Cost of Rodeo: \$ _____