
JOB ORDER COSTING: A SIMULATION AND VEHICLE FOR CONCEPTUAL DISCUSSION

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ABSTRACT

This paper offers a hands-on approach to teaching job order costing in introductory managerial accounting or in cost accounting. It is motivated by the belief that students would have a better appreciation of how goods and costs flow in a manufacturing firm through an experiential learning exercise as opposed to passive learning methods such as reading a text description or listening to a lecture. The exercise involves the simulated manufacture of a table from the purchase of raw materials through the sale of the finished product. Cost accumulation is illustrated using both actual and normal costing systems.

INTRODUCTION

Job order costing is typically covered in cost accounting and managerial accounting courses and appears in virtually all such textbooks (e.g., Hilton, 2005; Schneider, 2009). Students often have difficulty understanding job order costing because they do not have a good understanding of manufacturing processes. To overcome this lack of understanding, it would help for students to be exposed to an actual manufacturing operation. The exercise described in this paper allows the student to experience a manufacturing operation in the classroom. The exercise involves the manufacture of a custom-made table out of balsa wood and other materials. The process begins with the purchase of raw materials and ends with the sale of the finished product.

Although other approaches have used LEGO® blocks to teach management accounting terms and techniques (Roth, 2005; Morgan, Martin, Howard, & Mihalek, 2005; Burns & Mills, 1997), this simulation is different in two major ways: (1) it focuses solely and comprehensively on job order costing whereas previous articles have only superficially covered job order costing, and (2) by using the variety of materials called for in this simulation, the product and manufacturing process is more realistic, affording the students the ability to clearly see the differences between direct materials and indirect materials, direct labor and indirect labor, and other items that constitute manufacturing overhead. We feel that this is an extremely important differentiation not only in understanding traditional cost accounting, but in understanding activity-based costing, since the difference between the two methods lies with overhead. This method of teaching job order costing provides the student

with a hands-on experience and allows them to actively participate in the learning process. It is suitable for practically any classroom configuration with any number of students.

Two methods for increasing student interest discussed in the literature involve making the instruction fun and hands-on (Davis, 1993). The simulation described in this paper accomplishes both of those objectives. When students are interested in the topic, they are more likely to remember the lessons and key points (McKeachie, 1994). Simulations and role-play can be particularly effective teaching techniques by arousing interest, providing a concrete basis for discussion, and by illustrating the major principles from the lesson. Studies have shown active learning techniques such as simulations and role-play to be stronger than traditional methods of instruction in terms of knowledge retention, knowledge application, and motivational outcomes (Dekkers & Donatti 1981; McKeachie, 1999).

We have used this manufacturing simulation in undergraduate managerial and cost accounting classes, and in an MBA class to teach job order costing. The exercise reinforces cost and other concepts, such as types of costs and types of inventories, to which the students have been briefly exposed prior to learning about job order costing. The primary purpose of our exercise, however, is that it demonstrates how products flow through the factory and how the corresponding costs of making the product flow through the accounting system. The student sees first-hand how costs are accumulated and product cost is determined in a job order cost system. The exercise illustrates the use of source documents unique to job order costing such as the job cost sheet, time tickets, and materials requisition forms. The unique issues associated with how to charge manufacturing overhead to a particular job are also discussed, along with the procedures and concepts of an actual cost system versus a normal cost system.

OVERVIEW AND PURPOSES OF EXERCISE

We illustrate the flow of goods and costs in a manufacturing firm using a job order cost system by simulating a manufacturer of custom-made furniture. During a specified time period, we have a company working on three different pieces of furniture – table, bookshelves, and china cabinet. For simplicity, we fully demonstrate only the manufacture of the table. The process begins with the purchase of materials from a supplier and ends with the sale of the completed table to a customer. After the student has an understanding of the physical flow of the product through the factory and the corresponding flow of costs through the manufacturing accounts, the bookshelves and china cabinet are introduced through their already updated job-cost sheets. At the end of the period, it is assumed that the bookshelves are completed and in finished goods, and that the china cabinet remains in work in process inventory.

The simulation is divided into two parts; Part I illustrates the flow of the product through the manufacturing facility and the corresponding flow of costs through the accounting system, while Part II involves allocating manufacturing overhead to the job. Both an actual cost system and a

normal cost system are illustrated. Many different teaching opportunities present themselves throughout the simulation and are noted in our discussions.

The purposes of the exercise are:

- ◆ *To demonstrate how products flow through the factory.*
- ◆ *To demonstrate how the cost of making the product flows through the accounting system in a way that mirrors the physical flow of the goods through the factory.*
- ◆ *To demonstrate how manufacturing costs are accumulated and how unit cost is determined in a job order cost system.*
- ◆ *To demonstrate how manufacturing overhead is allocated; the unique issues associated with allocating overhead and how it is allocated in an actual cost system and in a normal cost system.*
- ◆ *To set the stage for a discussion of activity-based costing and comparison of traditional and ABC product costs.*
- ◆ *To actively engage the students, help form community in the classroom, and to make accounting fun.*

METHODOLOGICAL APPROACH

The instructor will need to provide the following supplies for the exercise:

- ◆ *Miniature bookshelves* to use as a prop in the finished goods (FG) inventory warehouse;*
- ◆ *Miniature china cabinet* (in incomplete form) to use as a prop in work in process (WIP) inventory;*
- ◆ *One piece (3/32" x 6" x 36") of balsa wood to serve as oak wood for a table base and legs [direct materials (DM)];*
- ◆ *One clear plastic sheet (8.5" x 11") protector (trimmed and separated) to serve as a glass top for the table [DM];*
- ◆ *One piece of non-adhesive felt (9" x 12") to protect the glass from the wood base [indirect materials (IM)];*
- ◆ *Glue [IM] to adhere the felt pads to the corners of the wood base;*
- ◆ *One small container of brown paste shoe polish for stain [IM];*
- ◆ *One piece of sandpaper [IM];*
- ◆ *One paper towel to rub stain on the table [IM];*
- ◆ *Ruler for measuring;*
- ◆ *Pencil for marking measurements;*
- ◆ *Cutting board;*

- ◆ *Knife and/or scissors to cut plastic paper sheet protector, felt, and wood (make sure that the knife/scissors is strong enough to accommodate the thickness of the wood);*
- ◆ *Masking tape to mark off the departments: Raw Materials (RM) Warehouse, two manufacturing departments – Cutting and Finishing, FG Warehouse. Masking tape may not be necessary if the classroom can be logically divided in another way. For example, we have used chairs to serve as the RM Warehouse and the FG Warehouse, and a table to serve as the manufacturing floor.*
- ◆ ** Miniature furniture may be purchased at a hobby store.*

We chose these particular materials to get a good mixture of direct materials and indirect materials. We use two examples of direct materials, and use indirect materials that are incorporated in the finished product (i.e., felt pads, glue, stain), as well as indirect materials that do not become part of the product (i.e., sandpaper, paper towel).

The instructor will need to select six students for the following roles:

- ◆ *One deliverer of the raw materials from an outside supplier*
- ◆ *One RM Warehouse Storekeeper*
- ◆ *Two direct labor (DL) workers:*
 - Cutting Department DL worker (DL worker A)*
 - Finishing Department DL worker (DL worker B)*
- ◆ *One FG Warehouse Supervisor*
- ◆ *One customer*

The instructor can act as the Production Supervisor as well as the Cost Accountant. Each of the students wears an 8.5" x 11" sign with their job title around their necks.

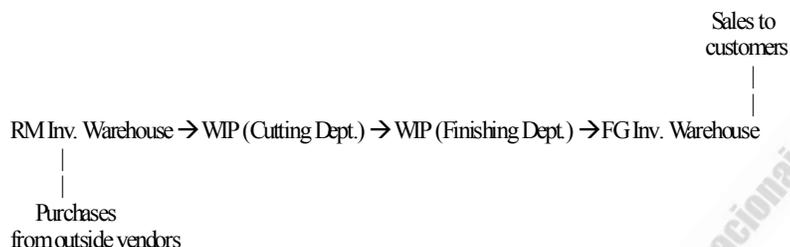
It is helpful to display a prototype of the table so the students have a visual of what they are trying to make. Also, in the interest of time, mention to the students that the table need not be made to perfection.

Students should be provided with the following five handouts:

- ◆ *"The Flow of Product Costs in a Manufacturing Company" (see Figure 1);*
- ◆ *"T-accounts for Assume Table is Finished and Sold" (see Figure 2);*
- ◆ *"Time Tickets & Materials Requisition Form" (see Figure 3);*
- ◆ *"Job Cost Sheets for Jobs #1, #2, and #3" (see Figure 4);*
- ◆ *"T-accounts for Assume Table is Finished and Sold, Bookshelves are Finished, and China Cabinet is Not Finished" (see Figure 5).*

MANUFACTURING PROCESS

The manufacturing facility encompasses the raw materials and finished goods warehouses, and the factory floor, where production takes place. The factory floor consists of two different manufacturing departments, the Cutting Department and the Finishing Department. A description of the factory floor follows:



When purchased, raw materials are delivered to the Raw Materials Inventory Warehouse where they are stored until requisitioned for production. When requisitioned, raw materials are moved out onto the factory floor where actual production takes place; all materials there are considered work-in-process until production is completed. In the Cutting Department and in the Finishing Department, factory employees combine materials with their labor to produce finished products. The finished products are then moved into the finished goods inventory warehouse and stored until sold.

PART I

Part I of the simulation illustrates the flow of the product through the factory and the corresponding flow of manufacturing costs through the accounting system.

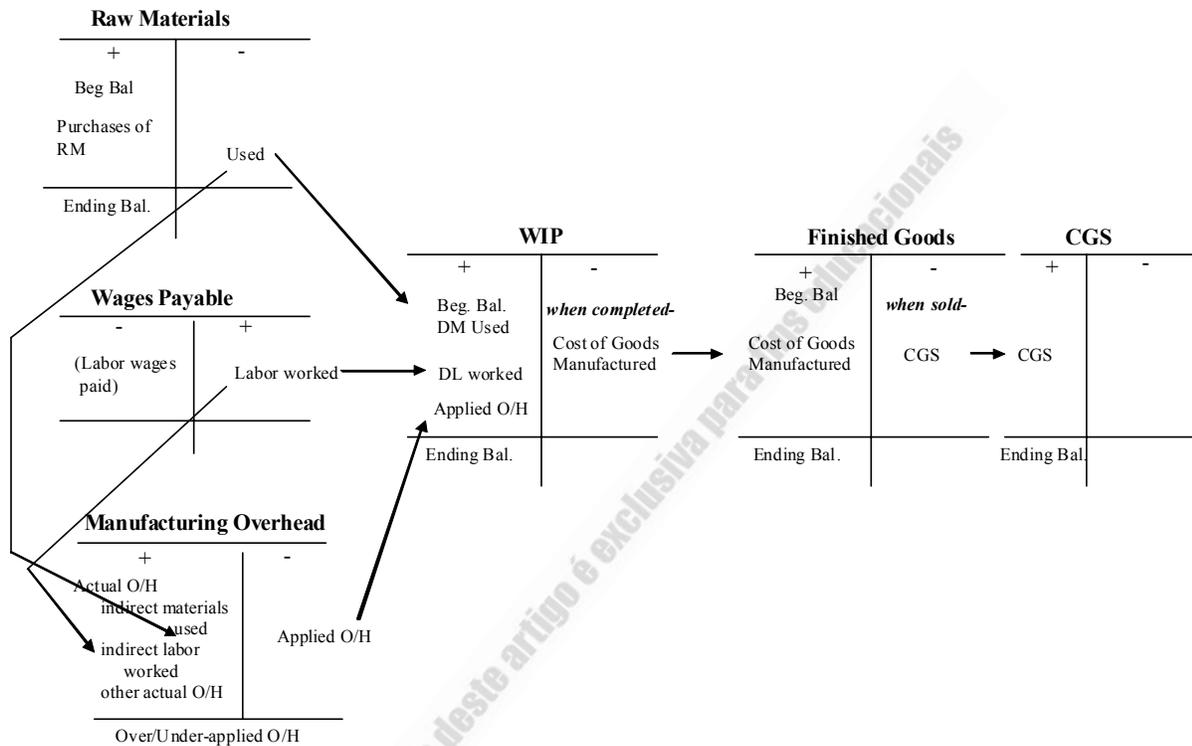
Teaching opportunity: Discuss the basics of a job order cost system and why it is being used in this particular manufacturing operation, as opposed to a process cost system.

The exercise commences with the following procedures:

Set up the classroom by designating space for the RM Warehouse, the factory floor containing two distinct departments for WIP (Cutting and Finishing), and the FG Warehouse.

Briefly review “The Flow of Product Costs in a Manufacturing Company” handout (see Figure 1), which presents the account entries needed throughout the manufacturing process from the purchase of raw materials to the sale of the products.

Figure 1 -- The Flow of Product Costs in a Manufacturing Company



The “T-accounts for Assume Table is Finished and Sold” handout (see Figure 2) should be copied on the board or placed on an overhead projector so that throughout the manufacture of the table, the instructor can demonstrate how the movement of the product costs through the accounting records mirrors the movement of the product through the factory. All T-accounts will have \$0 beginning balances.

Figure 2 -- T-accounts for Assume Table is Finished and Sold

Raw		Wages Payable		WIP		Finished Goods		CGS	
+	-	-	+	+	-	+	-	+	-
Manuf Overhead									
<i>Actual</i>	<i>Applied</i>								

At this time, the instructor begins to walk the students through the transactions and transitions that encompass the manufacturing process. The first transaction involves the purchase of raw materials. When purchased, raw materials (both direct materials and indirect materials) are delivered to the raw materials inventory warehouse where they are stored until taken out for production. Assume the company purchases \$4,000 of raw materials and places all direct and indirect materials (wood, glass, stain, felt, etc.) in the RM Warehouse. The instructor updates the Raw Materials T-account on the board by adding \$4,000 for the purchase from outside suppliers.

Next, the instructor explains the direct labor costs which involve two workers – one in the Cutting Department and the other in the Finishing Department. The job of DL worker A (Cutting Department) is to cut the wood and glass (i.e., sheet protector) for the table. DL worker A fills in his time ticket (see Figure 3), indicating he is starting work at 8:00 AM on Job #1. See Time Ticket #1 below.

Figure 3 -- Time Tickets & Materials Requisition Form

Time Ticket #1

Employee _____ Date _____

Started	Ended	Time Completed	Rate	Amount	Job Number
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Supervisor _____

Time Ticket #2

Employee _____ Date _____

Started	Ended	Time Completed	Rate	Amount	Job Number
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Supervisor _____

Materials Requisition Form

Job Number to Be Charged _____ Date _____

Department _____

Description	Quantity	Unit Cost	Total Cost
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Teaching opportunity: Explanation of a time ticket.

<u>Time Ticket #1</u>					
Employee: <i>Student's Name</i>			Date _____		
Started 8:00AM	Ended	Time Completed	Rate	Amount	Job Number <i>1 (Table)</i>
Supervisor: <i>Instructor's signature</i>					

DL worker A then requests the materials (i.e., wood and glass) needed to begin work on the table – Job #1.

Teaching opportunity: Explain the difference between DM and IM.

The wood and glass are DM and are economically worth tracing. Accordingly, DL worker A fills out a Materials Requisition Form (see Figure 3), asking for wood and glass, and presents it to the RM Warehouse Storekeeper.

Teaching opportunity: Explanation of a Materials Requisition Form.

The completed Materials Requisition Form appears below:

<u>Materials Requisition Form</u>			
Job Number to be Charged <u>1</u>		Date _____	
Department <i>Cutting</i>			
Description	Quantity	Unit Cost	Total Cost
<i>oak wood</i>	<i>48 sq. inches (one 6" x 8" board)</i>	<i>\$3.00/sq. in.</i>	<i>\$144.00</i>
<i>3/8" glass</i>	<i>80 sq. inches (one 8" x 10" glass)</i>	<i>\$.70/sq. in.</i>	<u><i>56.00</i></u>
			<i>\$200.00</i>
Authorized Signature <i>Instructor's signature</i>			

The Storekeeper gives DL worker A the requested materials and sends the Materials Requisition Form to the Cost Accounting Department. The Cost Accounting Department (i.e., the instructor) completes the cost information on the form (i.e., unit costs and total costs), and begins to keep track of the entire job's costs via a Job Cost Sheet (see Figure 4 for the Job Cost Sheets). The DM cost is entered on the Job Cost Sheet upon receipt of the Materials Requisition Form for

that specific job. For the table, Job #1, the total DM cost entered is \$200. In addition, the instructor updates the T-accounts on the board, moving \$200 out of the RM Inventory account and into the WIP T-account. Once on the factory floor, all materials are considered WIP until the process is completed.

Figure 4 -- JOB COST SHEETS FOR JOBS #1, #2, and #3

JOB #1 Table	JOB #2 Bookshelves	JOB #3 China Cabinet	
<u>Job Cost Sheet</u>	<u>Job Cost Sheet</u>	<u>Job Cost Sheet</u>	<u>TOTAL</u>
DM \$200	DM \$700	DM \$2,000	DM
DL 75 (5hrs.@ \$15)	DL 150 (10hrs.@ \$15)	DL 525 (35hrs.@ \$15)	DL
O/H	O/H	O/H	O/H
Total Cost	Total Cost	Total Cost	Total Cost

Teaching opportunity: Explanation of a Job Cost Sheet.

Next, DL worker A cuts the table, cuts the legs, and cuts the glass to the specified sizes. DL worker A begins making the table by cutting the wood to measure 6" wide and 8" long. Then, the student pokes a hole in the middle of the wood and cuts out a 2" wide and 4" long piece so that the student is left with a 2" frame that will serve as the base for the glass top. Using the 2" wide and 4" long piece, the student cuts four legs, each one approximately 4" long and 1/2" wide. Finally, DL worker A cuts the glass so that it measures 8" wide x 10" long.

We assume that DL worker A works on the table for three hours (5 - 10 minutes real time), and then sends the table to the Finishing Department. DL worker A updates the time ticket to indicate the time spent working on Job #1 (i.e., until 11:00 AM) and sends the time ticket to the Cost Accounting Department. The instructor finishes filling out Time Ticket #1, charging the time to Job #1, as follows:

<u>Time Ticket #1</u>					
Employee Student's Name _____			Date _____		
Started	Ended	Time Completed	Rate	Amount	Job Number
8:00AM	11:00 AM	3 hours	\$15.00	\$45.00	1
Cuts wood and glass.					
Supervisor Instructor's signature _____					

Using Time Ticket #1, the Cost Accounting Department updates the Job Cost Sheet for Job #1 with \$45 DL, and the instructor accordingly updates the T-accounts on the board, increasing Wages Payable and increasing WIP by \$45. The instructor may wish to emphasize that the DL costs become part of WIP, rather than being treated as wages expense.

Once the cutting portion of the job is complete, the job moves to the Finishing Department. There, the job of DL worker B is to stain and assemble the table. First, the student stains the wood frame and the four legs. The legs are then attached to the frame by inserting them into thin slits that the student cuts in each corner of the table frame. Finally, the student cuts the felt into four ½” square pieces and glues each piece to the outside corners of the wooden frame. The glass is then placed on top of the 2” wood frame and the table is complete! DL worker B fills in his time ticket, Time Ticket #2, to indicate he is beginning work on the table (Job #1) at 11:00 AM, as follows:

<u>Time Ticket #2</u>						
Employee <u>Student's Name</u>					Date _____	
Started	Ended	Time Completed	Rate	Amount	Job Number	
11:00AM					1	
Supervisor: <i>Instructor's signature</i>						

DL worker B commences his work by obtaining the (indirect) materials required to assemble and stain the table (i.e., sandpaper, stain, paper towel, felt, and glue).

Teaching opportunity: Discuss the differences between direct materials and indirect materials and how they are handled in the costing of the product. Note there is no materials requisition form required in the Finishing Department because of the costs of charging such immaterial amounts to the specific job compared to the benefits that would be achieved by doing so.

Assume that DL worker B works on the table for two hours (5 minutes real time). He stains the table, assembles it, puts on the felt pads, glass, etc., and takes the table to the Finished Goods Warehouse Supervisor. DL worker B updates his time ticket to reflect time worked from 11:00 – 1:00 on Job #1 and sends the time ticket to the Cost Accounting Department. The completed time ticket appears below:

<u>Time Ticket #2</u>					
Employee: <u>Student's name</u>				Date _____	
<u>Started</u>	<u>Ended</u>	<u>Time Completed</u>	<u>Rate</u>	<u>Amount</u>	<u>Job Number</u>
11:00AM	1:00 PM	2 hours	\$15.00	\$30.00	1
<i>Stains and assembles the table.</i>					
Supervisor: <u>Instructor's signature</u>					

The Cost Accounting Department updates the Job Cost Sheet for Job #1 with \$30 DL, and the instructor accordingly updates the T-accounts on the board, increasing Wages Payable and increasing WIP for \$30.

To finish costing the job, we need to charge it with manufacturing overhead. The techniques for allocating manufacturing overhead to the job are discussed in detail in Part II of the simulation. For now, the Cost Accounting Department should charge the job with \$125.00 of overhead (this will be the applied overhead amount using a predetermined overhead rate, as will be shown in Part II). The instructor updates the T-accounts on the board, crediting the manufacturing overhead account and charging WIP with \$125 of overhead. At this point, the Production Supervisor (i.e., the instructor) informs the class that Job #1 has been completed and is being transferred from WIP to FG.

The Finished Goods Warehouse Supervisor lets the Cost Accounting Department know that Job #1 has been transferred in. Cost Accounting will then close out the Job Cost Sheet for Job #1, and the instructor accordingly updates the T-accounts on the board, transferring the costs of the table (\$400) from WIP to FG. The instructor should point out that the \$400 cost of the table results from \$200 of DM, \$45 of Cutting Department DL, \$30 of Finishing Department DL, and \$125 of manufacturing overhead.

Assume that the table is sold on account to a customer for \$750. The customer (i.e., student) takes the table and returns to his seat. The instructor updates the FG and Cost of Goods Sold (CGS) T-accounts, transferring \$400 from FG to CGS, and then also recognizes \$750 of accounts receivable together with \$750 of sales revenue.

The bookshelves and china cabinet are now introduced through their already updated job-cost sheets. Refer to Job Cost Sheet handout (Figure 4), where dollar amounts for DL and DM have already been charged to the jobs. At the end of the period, it is assumed that the bookshelves are completed and in finished goods, while the china cabinet remains in WIP inventory. Further, we assume that Job #2 (the bookshelves) has been charged with \$250 of manufacturing overhead and Job #3 (the china cabinet) has been charged with \$875 of manufacturing overhead. The job cost

sheets for all three of the jobs can now be completed. At this time, the instructor resets the room, placing the china cabinet in the WIP area and the bookshelves in the FG area (the table is no longer in the factory).

Using the data from the completed Job Cost Sheets, fill in the blank T-accounts on Figure 5, which assumes that the table is finished and sold, the bookshelves are finished, and the china cabinet is not finished. The WIP T-account should have an ending balance of \$3,400, reflecting all charges to the china cabinet; the FG inventory should have an ending balance of \$1,100, reflecting all charges to the bookshelves; the CGS T-account should have a balance of \$400, reflecting the total cost of the table.

Figure 5 -- T-accounts for Assume Table is Finished and Sold, Bookshelves are Finished, and China Cabinet is Not Finished

Raw Materials		WIP		Finished Goods		CGS	
+	-	+	-	+	-	+	-

Wages Payable		WIP		Finished Goods		CGS	
-	+	+	-	+	-	+	-

Manuf. Overhead	
Actual	Applied

THE BIG PICTURE

After Figure 5 is completed, we show how the information in the WIP T-account, the FG T-account, and the RM T-account relates to the Schedule of Cost of Goods Manufactured (CGM), the Cost of Goods Sold (CGS) Schedule, and the Income Statement, as follows:

		Income Statement
Sales Revenue		\$750
- <u>CGS (unadjusted)</u>		<u>(400)</u> (see calculation below)
Gross Margin		\$350
	CGS	
Beginning FG inventory		\$0
+ CGM		+ 1,500 (see calculation below)
- <u>Ending FG inventory</u>		<u>(1,100)</u> (the bookshelves)
CGS		\$400 (the table)
	CGM	
DM used	\$2,900	
+ DL worked	+ 750	
+ Manufacturing overhead applied	+ 1,250	
+ Beginning WIP	+ 0	
- <u>Ending WIP</u>	<u>(3,400)</u> (the china cabinet)	
CGM	\$1,500 (\$400 for the table + \$1,100 for the bookshelves)	

PART II

Part II of the simulation demonstrates the allocation of manufacturing overhead to the products. To complete the job cost sheets in Part I, the instructor just tells the students how much manufacturing overhead to charge to each job. In Part II, we discuss how the amounts are derived. We feel that this is an extremely important aspect of the simulation not only in understanding traditional cost accounting, but in a subsequent understanding of activity-based costing, since the difference between the two methods relates to the assignment of overhead costs.

Teaching opportunity: Explain the definition of manufacturing overhead and have the class identify items in the simulation that constitute manufacturing overhead.

Examples:

- ◆ *indirect materials (stain, glue, felt, sandpaper); **
- ◆ *indirect labor (Production Supervisor's salary, RM Warehouse Storekeeper's salary, Cost Accountant's salary); **
- ◆ *depreciation or rent for factory (i.e., classroom); **
- ◆ *depreciation or rent for equipment (i.e., scissors, knife); **
- ◆ *utilities on factory; **
- ◆ *maintenance on factory;*

- ◆ *property taxes on factory;*
- ◆ *insurance on factory;*
- ◆ **items encountered during the classroom simulation in Part I.*

Teaching opportunity: Note that indirect labor does not include the FG Warehouse Supervisor's salary because it is a period (selling) cost rather than a product cost.

Teaching opportunity: Discuss the difficulty of charging manufacturing overhead to the jobs.

Explain that it may be impossible because of no direct cause/effect relationship, or it may not be economically practical to trace to the specific job. Also, discuss how an activity base should be selected and the problems involved with using one plant-wide cost driver.

The exercise now continues by first demonstrating the use of an actual costing system where the actual overhead will be allocated using DL hours as the cost driver. Assume that total overhead for the period amounted to \$1,500. Also, assume that only Jobs #1, #2, and #3 were worked on during the period, resulting in a total of 50 DL hours (5 hours for Job #1, 10 hours for Job #2, and 35 hours for Job #3). The plant-wide overhead rate is then computed as follows:

Actual Manufacturing Overhead Rate = \$1,500 / 50 DL hours = \$30 per DL hour

Teaching Opportunity: Discuss how actual manufacturing overhead is accumulated throughout the period and is added to the debit side of the Manufacturing Overhead account.

Now, the instructor fills out another set of Job Cost Sheets (see Figure 4). Overhead is allocated by multiplying the \$30 rate by the actual number of hours incurred by each job, as follows:

Job #1	Job#2	Job #3	Total
DM \$200	DM \$700	DM \$2,000	DM \$2,900
DL 75 (5 hrs. @ \$15)	DL 150 (10 hrs. @ \$15)	DL 525 (35 hrs. @ \$15)	DL 750 (50 hrs. @ \$15)
O/H 150 (5 hrs. @ \$30)	O/H 300 (10 hrs. @ \$30)	O/H 1,050 (35 hrs. @ \$30)	O/H 1,500 (50 hrs. @ \$30)
Total \$425	Total \$1,150	Total \$3,575	Total \$5,150

Teaching Opportunity: Discussion of the problems associated with using an actual manufacturing overhead rate and why a predetermined rate is used more often.

Next, the instructor shows how overhead would be applied in a normal costing system, using a predetermined overhead rate. Suppose that at the beginning of the period, the company estimated that manufacturing overhead would amount to \$1,000 and that a total of 40 DL hours would be worked on all three jobs. The predetermined overhead rate is then computed as follows:

$$\text{Predetermined Manufacturing Overhead Rate} = \$1,000 / 40 \text{ DL hours} = \$25 \text{ per DL hour}$$

At this time, the instructor fills out another set of Job Cost Sheets (see Figure 4) using the normal costing system. Overhead is applied by multiplying the \$25 predetermined overhead rate by the actual number of hours incurred by each job, as follows:

Job #1	Job#2	Job #3	Total
DM \$200	DM \$700	DM \$2,000	DM \$2,900
DL 75 (5 hrs. @ \$15)	DL 150 (10 hrs. @ \$15)	DL 525 (35 hrs. @ \$15)	DL 750 (50 hrs. @ \$15)
O/H 125 (5 hrs. @ \$25)	O/H 250 (10 hrs. @ \$25)	O/H 875 (35 hrs. @ \$25)	O/H 1,250 (50 hrs. @ \$25)
Total \$400	Total \$1,100	Total \$3,400	Total \$4,900

Note: These overhead amounts were the ones used in Part I of this exercise. The instructor may wish to compare these costs to the ones assigned earlier by the actual costing system.

Since the applied overhead of \$1,250 is less than the actual overhead of \$1,500, we have \$250 of underapplied overhead.

Teaching Opportunity: Discussion of overapplied and underapplied overhead and how these amounts are disposed of at the end of the period.

Using the most common approach for disposal of underapplied overhead, we close out the manufacturing overhead account in Figure 5 and add \$250 to cost of goods sold.

Teaching Opportunity: Discussion of the possible benefits of using departmental overhead rates rather than one plant-wide overhead rate.

Let us assume that the Cutting Department is highly automated (capital intensive) and the Finishing Department requires a lot of manual labor (labor intensive). We can therefore get a more accurate measure of product cost by using machine hours as the allocation base in the Cutting

Department (since machine hours “drive” more of the overhead in the Cutting Department) and by using direct labor hours as the activity base in the Finishing Department (since direct labor hours drive most of the overhead in the Finishing Department).

INSTRUCTORS' EXPERIENCES

This simulation has proven to be highly successful. It is not only an effective teaching method in terms of student comprehension and retention, but it is fun and provides a break from the regular classroom activities. Since job order costing is normally covered fairly early in the course, using this simulation gets the students interested in the course material from nearly the very beginning.

The exercise takes approximately 75 minutes. Of course, the amount of time can vary according to how much discussion the instructor solicits on the various teaching opportunities that are cited in the paper. The simulation can supplement or take the place of a traditional lecture. Part I and Part II can be separated into different consecutive days.

Students who have experienced this exercise have found it to be educational and fun. Many students have asked for another simulation after being exposed to this one. At the end of the semester, students' course evaluations commented on how much they remember from the simulation and how it helped them to understand job order costing. Occasionally, we receive e-mails about the exercise. One example is from a student who was taking cost accounting after having had managerial accounting: “I just wanted to let you know that the way you explained inventory with that skit still sticks in my mind, and I never really understood the flow of DM, WIP, and FG until I was able to visualize it that day. It is definitely helping me a lot in my accounting class this semester!” Another example is the following email received from an MBA student: “I also wanted to tell you that I really enjoyed last nights (sic) class. You mentioned that you had never done it in that manner. I felt it was an excellent way to help us learn. I have never had a teacher who got the whole class involved and paying attention to Accounting. :) It has always been a rough and hard subject for me but by you presenting the material in such a way, I felt it helped me learn. So good job!”

To more formally assess students' opinions about this job costing simulation, we administered a survey to two sections of undergraduate students in introductory managerial accounting courses after exposure to the simulation. We asked the students to respond to nine questions regarding their views about the simulation and we used a five point scale where “Strongly Agree” = 5 and “Strongly Disagree” = 1. The results appear in Table 1.

Table 1: Data from Student Survey		Mean (n = 61)
1.	This simulation helped me to understand the flow of goods in a manufacturing organization and the corresponding flow of product costs in the accounting system.	4.33
2.	This simulation helped me to understand how direct materials and direct labor costs are accumulated in a job-order cost system.	4.33
3.	This simulation helped me to understand how overhead is allocated in a job-order cost system.	4.20
4.	This simulation helped me to understand how product cost is calculated in a job-order cost system.	4.21
5.	This simulation helped me to understand the difference between direct materials and indirect materials.	4.36
6.	This simulation helped me to understand the difference between direct labor and indirect labor.	4.33
7.	This simulation helped me to understand the difference between actual manufacturing overhead and applied manufacturing overhead.	4.10
8.	The content of this simulation was meaningful and relevant.	4.25
9.	Overall, I found this to be a valuable learning experience.	4.23
Response Scale Strongly Agree = 5 Agree = 4 Neutral = 3 Disagree = 2 Strongly Disagree = 1		

The mean values from the 61 students are all greater than 4.00 for all nine questions. The first seven questions deal with students' understanding of specific aspects of job costing, such as overhead allocation and the distinction between direct and indirect labor. The results indicate that students believe the simulation helps them to understand various concepts relating to job costing. The last two questions are very general ones dealing with their overall views about the simulation. The results show that students feel the simulation to be a meaningful, relevant, and a valuable learning experience.

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