Teaching students the Production Cost Report - an evaluation and an alternative

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ABSTRACT

A challenging concept to successfully teach in accounting classes is the assignment of costs under the process costing system. Most pertinent textbooks rely on a similar series of steps resulting in a seemingly standardized production cost report. It has been the authors' experience that the majority of their students attempt to memorize the steps leading up to, and the format of, the report provided in the textbooks without understanding the analysis presented on the report. To compound the situation, informal conversations with management accountants reveal that the production cost report format, standardized in the accounting textbooks, is not standardized in accounting practice. Thus, it is especially important that students understand rather than memorize the analysis of the costs (both total and per unit) assigned to ending inventory and the goods transferred to the next process or completed. Additionally, promoting the understanding of the concepts generally results in increased retention by students. In this paper, the authors survey the current textbook presentation of the process costing system and suggest an alternative method of teaching process costing that will encourage an understanding by students, rather than memorization. The emphasis of this approach is on problem-solving, rather than completing steps or "filling in the blanks."

Keywords: process, cost, accounting, teaching, production, report, textbook

INTRODUCTION

In the course of teaching classes in Management Accounting and Cost Accounting for a number of years, the authors have discovered that one of the most challenging concepts for students to fully appreciate, and consequently understand, is the assignment of costs under a process costing system. The pedagogy of creating the learning environment essential to the understanding of the underlying events is, in the authors' opinion, unnecessarily complicated by the use of the Production Cost Report (hereafter PCR) or its ilk in accounting textbooks. The challenges facing the educator are compounded by the predilection on the part of students to attempt to memorize the format of the report provided in the textbooks without understanding the analysis represented by the report. To confound the situation, conversations with management accountants reveal that the PCR format, standardized in the accounting textbooks, is not standardized in accounting practice. Thus, it is especially important that students understand rather than memorize the analysis of the costs (both total and per unit) assigned to ending inventory and the goods transferred to the next process or completed.

The purpose of this paper is to summarize the current textbook approach to process costing and describe an alternative approach of the analyses of costs associated with a process costing system that will encourage understanding, rather than memorization. The emphasis of this approach is on the goals of the analysis, rather than "filling in the blanks." To provide a basis for comparison, the next two sections present the results of a convenience survey of the coverage of process costing and the PCR in current managerial, cost and principles of accounting textbooks. The fourth section describes an alternative presentation that the authors feel will enhance student understanding and is more relevant given current accounting practice. This alternative approach may be used with both the first-in, first-out (FIFO) and the weighted average cost flow assumptions. The paper concludes with a summary section.

CURRENT TEXTBOOK PROCESS COSTING PRESENTATIONS

At many institutions, introductory accounting courses include students from a variety of majors and minors. Thus introductory accounting courses must meet the needs of both students who intend to prepare the managerial accounting information and students who expect only to use the output of an accounting information system. Since most accounting majors are required to take a cost accounting course to satisfy their major requirements which revisits the accounting techniques associated with a process costing system, the introductory management accounting course can cater more to the accounting information users, that is, the non-accounting majors. Thus, coverage of process costing principles in the introductory textbooks (the managerial accounting textbooks and the principles of accounting textbooks) (for example, Easton, Halsey, McAnally and Hartgraves, 2008, Warren, 2009, Weygandt, Kimmel, Kieso, 2009, Warren, Reeve and Duchac, 2009a and b, Horngren and Harrison, 2007, Heisinger, 2010, Braun, Tietz and Harrison, 2010, Balakrishnan, Sivaramakrishnan and Sprinkle, 2009, Edmonds, Tsay and Olds, 2009, Jackson, Sawyers and Jenkins, 2009, Hilton, 2009, Mowen and Hansen, 2008, Atkinson, Kaplan, Matsumura and Young, 2007, Jiambalvo, 2007, Albrecht, Stice and Stice, 2005) may reasonably differ from the coverage in cost accounting textbooks in both focus and depth (for example, Kinney and Raiborn, 2009, Horngren, Datar, Foster, Rajan and Ittner, 2009, Hilton, Maher and Selto, 2008, Blocher, Stout, Cokins and Chen, 2008, Eldenburg and Wolcott, 2005, and VanDerbeck, 2005). Consequently, the three types of accounting textbooks (cost,

managerial and principles) are discussed both jointly and separately.

A convenience survey of cost accounting textbooks, management accounting textbooks, and principles of accounting textbooks from major publishers in the United States reveals consistencies in the presentation of the principles behind, and the format of, the PCR at both the introductory level and the more advanced, cost accounting, level. Tables 1, 2 and 3 (Appendix) summarize some of the characteristics of the presentation, including approximately where in the textbook process costing is described, the name of the related report, which cost flow assumptions are demonstrated, and the steps presented to calculate the unit costs and the costs assigned to the ending work-in-process (WIP) versus the units transferred out in a process costing system. An examination of these tables reveals several interesting findings.

One finding of interest is the placement of the presentation of the process costing system in the textbook relative to that of the job order costing system. Not surprisingly, the presentation of job order costing precedes that of process costing, regardless of whether each system is covered in the same chapter, a separate chapter or in an appendix. Job order costing is generally viewed as the easier system with which to introduce students to the flow of costs in a manufacturing setting. It is intuitively appealing and lacks the complication of the concepts and calculations of equivalent units. Traditionally, the presentation of process costing has immediately followed that of job order costing. However, in the textbooks surveyed here, while job order costing continues to be presented relatively early in the textbook to demonstrate product cost flows, the presentation of the process costing system is being postponed or omitted altogether. Of the thirteen managerial accounting textbooks reported in Table 1, the three textbooks with 2010 copyright dates covered activity based costing between job order costing and process costing. In previous versions of these textbooks process costing immediately followed job order costing. One managerial accounting textbook by Noreen, Brewer and Garrison (2008) omitted the coverage of process costing altogether (not in Table 1), whereas an earlier edition of this textbook (Brewer, Garrison, and Noreen, 2005) included seventeen pages of process costing using the weighted average assumption. Of the seven cost accounting textbooks reported in Table 3, three of them covered five or more chapters in between job order costing and process costing. The less prominent placement of process costing, even in the cost accounting textbooks, is consistent with a decline in its perceived relative importance in accounting practice. For example, in a survey of members of the Institute of Management Accountants and the American Institute of Certified Public Accountants, job order costing (and operations costing) ranked among the top 30 out of 86 most important topics for staff positions in management accounting while process costing did not. (Ahadiat, 2008).

Also consistent with a decline in the coverage of process costing is the finding that over the past decade, introductory accounting textbooks have begun limiting their presentation of process costing by assuming no beginning inventory or covering only one of the cost flow assumptions. Of the thirteen managerial accounting textbooks listed in Table 1, six omitted the FIFO cost flow assumption. One of these referred students to a companion website for coverage of the FIFO assumption. One of the managerial accounting textbooks omitted the weighted average assumption, four presented the weighted average assumption first, then the FIFO assumption, and two presented the FIFO assumption first and then the weighted average assumption. Among the accounting principles books reviewed (see Table 2 - Appendix), only two of the seven textbooks omitted the FIFO assumption. The majority of the accounting principles textbooks presented the weighted average assumption first and then the FIFO assumption. One textbook presented the FIFO assumption first, then the weighted average

assumption. As might be expected, all of the cost accounting textbooks reviewed presented both cost flow assumptions (see Table 3 - Appendix). Five of the cost accounting textbooks presented the weighted average assumption first, then the FIFO assumption; one presented the FIFO assumption first. One of the textbooks presented both of the cost flow assumptions together, comparing them step by step (Eldenburg & Wolcott, 2005).

The current prevalence of the weighted average assumption in the accounting principles textbooks represents a retreat from the FIFO assumption in several cases. For example, in their 1999 *Fundamental Accounting Principles* textbook, Larson, Wild and Chiappetta presented only the FIFO assumption. By 2008 Wild, Larson, and Chiappetta presented the weighted average assumption in the body of the chapter and the FIFO assumption in the chapter appendix. Some authors feel that the weighted average method is easier to learn and apply (for example, Hilton, Maher and Selto, 2008). One managerial accounting textbook states that "the differences between the two methods are usually immaterial" (Braun, Tietz and Harrison, 2010). Some authors indicated that the weighted average method is more widely used in practice but gave no supporting references (for example, Hilton, 2009, Atkinson, Kaplan, Matsumura and Young, 2007, and Horngren, Datar, Foster, Rajan, and Ittner, 2009). This dominance of the weighted average assumption in accounting textbooks is particularly noteworthy given that the FIFO assumption is more accurate, generally better reflects the physical flow of the cost inputs and, with the availability of software for manufacturing entities, is no longer onerous to calculate in practice.

In summary, at the principles level, the process costing system is being relegated to a more superficial and delayed presentation when compared with the job order costing system. The weighted average cost flow assumption is more commonly emphasized, with the FIFO assumption either presented subsequently or omitted entirely. At the cost accounting level, there is also a trend toward delayed coverage of the process costing system, uncoupled with the job order costing system. At the advanced (cost) level, both the weighted average and the FIFO cost flow assumptions are presented with the weighted average method generally presented first. These findings provide the setting for the discussion in the next section of the presentation of the production cost report in accounting textbooks. See Tables 1, 2, and 3 in the Appendix.

THE PRODUCTION COST REPORT (PCR)

The primary purposes of a process costing system are generally identified as computing the unit costs of the various factors of production (in textbooks, generally these are simplified into direct materials and conversion costs), and the assigning of costs to the units transferred out of a process and the units remaining in the process (for example, Weygandt, Kimmel and Kieso, 2008 and 2009, Warren, Reeve and Duchac, 2009a and b, Warren, 2009, Wild, Larson and Chiappetta, 2008, Easton, Halsey, McAnally and Hartgraves, 2008,, Horngren and Harrison, 2007, and Pollard, Mills and Harrison, 2007, Heisinger, 2010, Braun, Tietz and Harrison, 2010, Oliver and Horngren, 2010, Balakrishnan, Sivaramakrishnan and Sprinkle, 2009, Edmonds, Tsay and Olds, 2009, Jackson, Sawyers and Jenkins, 2009, Hilton, 2009, Mowen and Hansen, 2008, Atkinson, Kaplan, Matsumura and Young, 2007, Jiambalvo, 2007, Albrecht, Stice and Stice, 2005, Hansen, Mowen and Guan, 2009, Kinney and Raiborn, 2009, Horngren, Datar, Foster, Rajan and Ittner, 2009, Hilton, Maher and Selto, 2008, Blocher, Stout, Cokins and Chen, 2008, and Eldenburg and Wolcott, 2005, and VanDerbeck, 2005). The uses of the unit costs and cost assignment in planning,

performance evaluation, and control are variously described. In most of the accounting textbooks reviewed here, the summary of the unit costs and cost assignments calculations are presented in the form of a "production cost report" (also called a "cost of production report", a "process costing report", a "product cost report", a "departmental production report", or a "process cost summary"). An example of a PCR is provided in Exhibit A (Appendix).

The expressed importance of this report in practice varies from textbook to textbook. Some textbooks indicated that the report is the "key" or "important" document in a typical process costing system (for example, Hilton, 2009, Weygandt, Kimmel, and Kieso, 2008, Wild, Larson, and Chiappetta, 2008), that it is used by most companies that use a process costing system (Braun, Tietz, and Harrison, 2010), or that it is "frequently" or "typically" used by unspecified users (for example, Edmonds, Tsay, and Olds, 2009, and Heisinger, 2010). More often the PRC is vaguely introduced as the report or document that can be used to summarize the operations or calculations associated with a process costing system.

To generate the information for the PCR, students are led through a series of steps (see Tables 1, 2 and 3). The series of four to six steps cover the following calculations:

a. Calculate the flow of physical units of output (or units to be accounted for and units accounted for).
b. Calculate output in terms of equivalent units for each production element.
c. Calculate total costs for each production element to be accounted for.
d. Calculate the costs per equivalent units.
e. Assign total costs to units completed and to units in ending WIP (or costs accounted for).

The students are given the impression that these steps are standardized and adherence to them is important through the use of phrases such as the "key steps", "we must use the following five-step process costing procedure," and "the five steps to process costing are." The importance of these steps is reinforced in the assignments at the end of the chapter.

Recently some of the textbooks have begun presenting the steps and the PCR with more of a spreadsheet look (for example, Heisinger, 2010, Braun, Tietz and Harrison, 2010, Horngren, 2010, Warren, Reeve and Duchac, 2009a and 2009b, Weygandt, Kimmel and Kieso, 2008, Horngren and Harrison, 2007, Weygandt, Kimmel and Kieso, 2009, Pollard, Mills, and Harrison, 2007, and Horngren, Datar, Foster, Rajan, and Ittner, 2009). For the textbooks reviewed here, this was true for five of the thirteen managerial accounting textbooks, four of the seven principles of accounting textbooks and only one of the seven cost accounting textbooks (see Tables 1, 2 and 3). However, none of the textbooks reviewed emphasized creating a spreadsheet with an input section and an output section that could be used for numerous examples without modification.

In summary, the current textbook presentation of the process costing system encourages students to view the system as an isolated topic, and to memorize steps and the PCR format. For example, it is the authors' experience that when students are asked to calculate equivalent units for materials, they often either produce calculations in steps 1 and 2 for both materials and conversion costs, or attempt to reproduce the top (and sometimes more) of the full PCR. In the next section, an alternative approach is proposed that emphasizes the students' understanding rather than memorization, and encourages the students to take a more integrative view of process costing.

A PROBLEM-SOLVING APPROACH

The evolution of this particular alternative method began with the effort to teach the steps

leading up to the PCR. It quickly became apparent to the authors that this approach was not conducive to understanding the underlying situations, but rather was viewed by the students as a necessary evil for passing that part of the examination to which it applied. This left the teaching experience devoid of any meaningful value either for the students as learners, or for the authors as teachers. This experience led to the development of an alternative method of presenting the process costing system.

Rather than impose a series of steps or a template to be memorized, a situation is presented and the students are encouraged to use a problem-solving approach which has broad applications in management accounting and cost accounting, and encourages an understanding of the underlying issues and events. Using this approach the students are encouraged to determine the problem, the information needed to solve the problem, the process to solve the problem, and their recommended solution(s).

In the classroom, the problem-solving approach might proceed as follows. First the instructor describes a simple one-process manufacturing situation for which a process costing system is appropriate and asks how costs for financial reporting might be calculated. Since students presumably already have knowledge of the job order costing system, they might logically try to apply it to the given situation. This provides an opportunity to compare and contrast the applicability of the two systems. In a cost accounting class, it also provides an opportunity to discuss operations costing. Once the "problem" (determine the cost of goods sold and the cost of inventory according to generally accepted accounting principles) is identified and how the problem will be solved (the concepts of a process costing system) is determined, students are asked to identify the information needed and its source. Once the desired information is identified, the instructor provides the "numbers". Rather than list a series of steps or focus on completing a PCR, students might be divided into groups and asked to calculate the costs attached to ending work-in-process and to the units completed. The various processes used by the students provide a basis for a discussion of the use of equivalent units as an allocation basis.

The authors suggest several advantages to using this approach. First, this approach reflects how management accounting information is driven by its use. The accounting information system must first provide information to meet regulatory needs (for taxing authorities, external financial reporting and possibly government industry oversight) and then provide additional information for management use loosely measured against a cost-benefit threshold. Management accounting information needs are internally driven rather than externally imposed. Thus memorization is less appropriate (and effective) than it would be for financial reporting to external users.

Second, the allocation of dollar amounts is a recurring theme in accounting. The sooner students understand and integrate the major concepts rather than memorizing each application in isolation, the easier and more enjoyable the subject matter will be. For example, the concept of equivalent units is not unlike that of calculating the weighted average number of shares of common stock outstanding in the earnings per share calculation.

Third, in a real world situation, identifying and locating the information needed to solve a problem can be challenging. The learning situations should require students to practice this step. Proper identification of the information needed requires an understanding of the process to be used as well as an awareness of the costs and benefits of obtaining the information.

How can textbooks promote the problem-solving approach? First, process costing techniques should be discussed in terms of satisfying a need or solving a problem. Attention

should be paid to the information available to help solve the problem and where it might be found. Next, rather than a series of steps, questions can be posited which are accompanied by discussions including that of possible alternatives. Where possible, the similarities of the current situation or process with those covered previously should be discussed. It is recognized that a summary of the process costing system might involve a listing of steps, but this should be presented at the end of the chapter, rather than as the basis for learning the process costing system. The exercises and especially the problems at the end of the chapter should take a more realistic approach by emphasizing situational problem-solving and providing both relevant and irrelevant information.

As noted in Tables 1, 2 and 3, some of the textbooks included spreadsheet-like exhibits. Once the process costing system has been presented, practice with spreadsheets can be included in such a way as to enhance the problem-solving approach. Students may be asked to create a spreadsheet that emphasizes the general concepts of an input section and an output section. The output section should employ formulas and cell references, and present the information in a readily understandable format. In keeping with the nature of management accounting information students should be evaluated on their ability to create a spreadsheet that solves a problem and communicates the relevant information, not their ability to reproduce an artificially standardized format.

CONCLUSIONS

The authors, reflecting on the significance of the PCR, found it odd that in the one area of accounting (cost/managerial) not dominated by a regulatory body that mandates requirements, uniformity in presentation by the textbook authors creates the impression of a "statement" requirement where none exists. The proliferation of the PCR in accounting textbooks despite anecdotal evidence to the contrary in practice evidences a disconnect between the classroom experience and accounting practice that hampers the students' efforts to achieve literacy in the process costing vernacular, purpose and process. The current textbook presentations hamper the students' understanding in several other ways as well. Process costing is taught as a series of steps which encourages students to memorize the steps rather than understand the process. Additionally, in many of the textbooks, the weighted average method is emphasized for ease of calculation over the first-in, first-out method which is conceptually superior. Consequently the authors propose an alternative method of presenting the concepts associated with the process costing system. This alternative method takes a problem-solving approach that encourages the students' understanding of the goals and processes of the cost assignments as they relate to accounting practice, and promotes the students' retention. The result will be a more educational and enjoyable classroom experience for both students and instructors.

Appendix

TABLE 1: Process Costing Presentations in Management Accounting

Textbook Name & Authors	Presentation of Production Cost Report & Cost Flow Assumptions	Steps in the Analysis
Cornerstones of Managerial Accounting (Mowen & Hansen, 2008)	Chapter 6 of 16 (Job-3); "Production Report:" Weighted Average (FIFO in chapter appendix) No spreadsheet exhibits	1. Physical flow analysis. 2. Calculation of equivalent units. 3. Computation of unit cost. 4. Valuation of inventories (goods transferred out and EWIP). 5. Cost reconciliation.
Essentials of Managerial Accounting (Heisinger, 2010)	Chapter 4 of 13 (Job-2); "Production Cost Report;" Weighted- Average (FIFO in chapter appendix); Spreadsheet format--no cell formulas	(Enumerated in the Production Cost Report) 1. Summarize the physical flow of units and compute the equivalent units for direct materials, direct labor and overhead. 2. Summarize the costs to be accounted for (separated into direct materials, direct labor, and overhead). 3. Calculate the cost per equivalent unit. 4. Use the cost per equivalent unit to assign costs to (1) completed units transferred out, and (2) units in ending WIP Inventory
Fundamental Managerial Accounting Concepts (Edmonds, Tsay & Olds, 2009)	Chapter 12 of 14 (Job-12); "Cost of Production Report;" Weighted-Average (no FIFO); No spreadsheet exhibits	(No steps enumerated) Sections of the Cost of Production Report:: • Determination of equivalent units. • Determination of cost per unit. • Cost allocation.
Management Accounting (Atkinson, Kaplan, Matsumura & Young, 2007)	Chapter 3 of 12 (Job-3); No report. Weighted-Average (no FIFO) No spreadsheet exhibits	(No steps enumerated) Successive exhibits of calculations: • Production data (flow of physical units.). • Equivalent units of production. • Cost per equivalent units.
Management Accounting (Balakrishnan, Sivaramakrishnan & Sprinkle, 2009)	Chapter 15 of 16 (Job-14); "Process Costing Report" Weighted- Average (no FIFO); No spreadsheet exhibits	(Enumerated in the Process Costing Report) 1. Track the physical flow. 2. Compute equivalent units. 3. Collect costs to allocate. 4. Calculate the rate per equivalent unit. 5. Allocate costs.
Managerial Accounting (Braun, Tietz & Harrison, 2010)	Chapter 5 of 14 (Job-3); "Product Cost Report;" Weighted- Average (no FIFO); Report in spreadsheet format--no cell formulas	(Enumerated in the Product Cost Report) 1. Summarize the flow of physical units. 2. Compute output in terms of equivalent units. 3. Summarize total costs to account for. 4. Compute the cost per equivalent unit. 5. Assign total costs to units completed and to units in ending WIP inventory
Managerial Accounting (Jiambalvo, 2007)	Chapter 3 of 14 (Job-2); "Production Cost Report;" Weighted Average (no FIFO); No spreadsheet exhibits	1. Account for the number of physical units. 2. Calculate the cost per equivalent unit for material, labor, and overhead. 3. Assign cost to items completed and items in ending WIP. 4. Account for the amount of product cost.

Managerial Accounting (Oliver & Horngren, 2010)	Chapter 4 of 14 (Job-2); "Cost of Production Report;" Weighted Average then FIFO; Spreadsheet format & explanation	1. Summarize the flow of physical units. 2. Compute output in terms of equivalent units. 3. Compute the cost per equivalent unit. 4. Assign costs to units completed and to units still in ending Work in process inventory.
Managerial Accounting (Swain, Albrecht, Stice & Stice, 2005)	Chapter 3 of 10 (Job-3); "Production Cost Report;" FIFO (no Weighted-Average); No spreadsheet exhibits	1. Compute equivalent units of production. 2. Compute the product costs per unit 3. Compute the costs transferred out. 4. Compute costs of ending work-in-process inventory. 5. Prepare the production cost report.
Managerial Accounting (Warren, Reeve & Duchac, 2009b)	Chapter 3 of 14 (Job-2); "Cost of Production Report"; FIFO (Weighted Average in chapter appendix); Spreadsheet exhibits and report without cell formulas.	(Enumerated in the Cost of Production Report) 1. Determine the units to be assigned costs. 2. Compute equivalent units of production. 3. Determine the cost per equivalent unit. 4. Allocate costs to units transferred out and partially completed units.
Managerial Accounting: A Focus on Ethical Decision Making (Jackson, Sawyers & Jenkins, 2009)	Chapter 5 of 17 (Job-5); (No production report); In chapter appendix cover FIFO, then Weighted-Average. No spreadsheet exhibits.	1. Analyze the physical flow of units and their associated costs. 2. Calculate the equivalent units of production. 3. Calculate manufacturing costs per equivalent unit 4. Allocate costs incurred to the finished units and the ending WIP.
Managerial Accounting: Creating Value in a Dynamic Business Environment (Hilton, 2009)	Chapter 4 of 17 (Job-3); "Departmental Production Report"; Weighted-Average (FIFO in companion website only); Spreadsheet exhibit of input data only.	1. Analysis of Physical Flow of Units 2. Calculation of Equivalent Units 3. Computation of Unit Costs 4. Analysis of Total Costs
Managerial Accounting, Tools for Business Decision Making (Weygandt, Kimmel & Kieso, 2008)	Chapter 3 of 14 (Job-2); "Production Cost Report;" Weighted- Average (FIFO in chapter appendix); Report in spreadsheet format--no cell formulas	(Enumerated in the Production Cost Report) 1: Compute the physical unit flow. 2: Compute equivalent units of production. 3: Compute unit production costs. 4: Prepare a cost reconciliation schedule.

TABLE 2: Process Costing Presentations in Principles of Accounting Textbooks

Textbook Name & Authors	Presentation of Production Cost Report & Cost Flow Assumptions	Steps in the Analysis
Accounting (Horngren & Harrison, 2007)	Chapter 20 of 25 (Job-19); "Production Cost Report", Weighted-Average (FIFO in chapter appendix); Spreadsheet-like exhibits	1. Summarize the flow of physical units. 2. Compute output in terms of equivalent units. 3. Compute the cost per equivalent unit. 4. Assign costs to units completed and to units still in ending work in process inventory.
Accounting (Warren, Reeve & Duchac, 2009a)	Chapter 20 of 26 (Job-19); "Cost of Production Report;" FIFO (Weighted Average in chapter appendix) Report in spreadsheet format shown without cell formulas.	(Enumerated in the Cost of Production Report) 1: Determine the units to be assigned costs. 2: Compute equivalent units of production. 3: Determine the cost per equivalent unit. 4: Allocate costs to units transferred out and partially completed units.
Accounting Principles (Weygandt, Kimmel & Kieso, 2009)	Chapter 21 of 26 (Job 20); "Production Cost Report;" Weighted- Average (FIFO in chapter appendix); Report in spreadsheet format shown without cell formulas	(Enumerated in the Production Cost Report) 1: Prepare a physical unit schedule. 2: Compute equivalent units. 3: Compute unit costs. 4: Prepare a cost reconciliation schedule.
Financial & Managerial Accounting for MBAs (Easton, Halsey, McAnally & Hartgraves, 2008)	Chapter 18 of 23 (Job-18); "Cost of Production Report;"; Weighted Average (no FIFO); No spreadsheet exhibits.	(No steps enumerated) Sections of the Cost of Production Report:: • Summary of units in process • Equivalent units. • Accounting for total costs
Fundamental Accounting Principles (Wild, Larson & Chiappetta, 2008)	Chapter 20 of 25 (Job-19); "Process Cost Summary;" Weighted Average (FIFO in chapter appendix); No spreadsheet exhibits.	1: Determine physical flow of units 2: Compute equivalent units of production 3: Compute cost per equivalent unit 4: Assign and reconcile costs
Principles of Accounting (Pollard, Mills & Harrison, 2007)	Chapter 17 of 21 (Job 16); "Production Cost Report;" Weighted-Average (FIFO in chapter appendix); Spreadsheet exhibits without cell formulas.	1: Summarize the flow of physical units. 2: Compute output in terms of equivalent units. 3: Compute the cost per equivalent unit. 4: Assign costs to units completed and to units in ending WIP inventory.
Survey of Accounting (Warren, 2009)	Textbook Appendix B (Job-10 of 15); "Cost of Production Report;" Average Cost (no FIFO); No spreadsheet exhibits.	(Enumerated in the Cost of Production Report) 1: Determine the units to be assigned costs. 2: Calculate equivalent units of production. 3: Determine the cost per equivalent unit. 4: Allocate costs to transferred and partially completed units.

TABLE 3: Process Costing Presentations in Cost Accounting Textbooks		
Textbook Name & Authors	**Presentation of Production Cost Report & Cost Flow Assumptions**	**Steps in the Analysis**
Cost Accounting, A Managerial Emphasis (Horngren, Datar, Foster, Rajan & Ittner, 2009)	Chapter 17 of 23 (Job-4); Two Spreadsheets: "Flow of Production" & Untitled (steps 3,4 & 5); Weighted- Average, then FIFO	(Steps Enumerated in the Spreadsheets) 1: Summarize the flow of physical units of output. 2: Compute output in terms of equivalent units. 3: Summarize total costs to account for. 4: Compute equivalent unit costs. 5: Assign total costs to units completed and to units in ending WIP.
Cost Accounting, Foundations and Evolutions (Kinney & Raiborn, 2009)	Chapter 6 of 19 (Job-5); "Cost of Production Report;" Weighted- Average, then FIFO; No spreadsheet exhibits.	1: Calculate the physical units to account for. 2: Calculate the physical units accounted for. 3: Calculate the equivalent units of production. 4: Calculate the total cost to account for. 5: Calculate the cost per equivalent unit of production. 6: Assign costs to inventories.
Cost Management:A Strategic Emphasis (Blocher, Stout, Cokins & Chen, 2008)	Chapter 11 of 20 (Job-4); "Production Cost Report;" Weighted- Average, then FIFO; No spreadsheet exhibits.	(Steps Enumerated in the Production Report) 1: Analyze the physical flow of production units. 2: Calculate equivalent units for each manufacturing cost element. 3: Determine total costs for each manufacturing cost element. 4: Compute cost per equivalent unit for each manufacturing cost element. 5: Assign total manufacturing costs to units completed and ending WIP. (includes a cost reconciliation).
Cost Management, Accounting &Control (Hansen, Mowen & Guan, 2009)	Chapter 6 of 21 (Job-5); "Cost of Production Report;' FIFO, then Weighted-Average No spreadsheet exhibits.	1: Physical flow analysis. 2: Calculation of equivalent units. 3: Computation of unit cost. 4: Valuation of inventories. 5: Cost reconciliation.
Cost Management: Measuring, Monitoring and Motivating Performance (Eldenburg & Wolcott, 2005)	Chapter 6 of 16 (Job-5); "Process Cost Report;" FIFO & Weighted Average together and compared. No spreadsheet exhibits.	1. Summarize total costs to account for. 2. Summarize total physical and equivalent units. 3. Compute cost per equivalent unit. 4. Account for cost of units completed and cost of ending WIP.
Cost Management, Strategies for Business Decisions (Hilton, Maher, Selto, 2008)	Chapter 8 of 20 (Job-3); "Production Cost Report;" Weighted- Average (FIFO in chapter appendix) No spreadsheet exhibits	(Steps Enumerated as "Sections" in the Production Cost Report) 1: Summarize the flow of physical units. 2: Compute the equivalent number of units produced. 3: Summarize the total costs to be accounted for. 4: Compute costs per equivalent unit. 5: Assign costs to goods transferred out and to ending WIP inventory.
Principles of Cost Accounting (VanDerbeck, 2005)	Chapter 5,6 of 10 (Job-1,2,3); "Cost of Production Summary;" Average Cost in Ch 5; FIFO in Ch 6 No spreadsheet exhibits.	1. Accumulating costs for which the department is accountable. 2. Calculating equivalent production for the period. 3. Computing the unit cost for the period. 4. Summarizing the disposition of the production costs.

Exhibit A: Production Cost Report Example—First-in, First-Out (FIFO)				
		Equivalent Units		
FLOW OF PHYSICAL UNITS **Units to Account for (or Input):**	**Physical Units**	**Completion Percentage**	**Direct Materials***	**Conversion Costs***
Beginning Work in Process (WIP)	1,000			
Direct Materials (100% x 1,000)		100%	(1,000)	
Conversion Costs (60% x 1,000)		60%		(600)
Units Started This Period	10,000			
Total Units to Account for (Total Input)	11,000			
Units Accounted for (or Output):				
Beginning WIP Completed	1,000	100%	1,000	1,000
Units Started & Completed This Period	8,500	100%	8,500	8,500
Ending WIP	1,500			
Direct Materials (100% x 1,500)		100%	1,500	
Conversion Costs (80% x 1,500)		80%		1,200
Total Units Accounted for (Total Output)	11,000			
Total Equivalent Units			10,000	10,100
FLOW OF COSTS **Costs to be Assigned (or Input):**		**Total Costs**	**Direct Materials**	**Conversion Costs**
Beginning WIP		$25,272		
Costs Added in Current Period		312,105	$150,000	$162,105
Total Costs to Account for (Total Input)		$337,377		
Divided by Total Equivalent Units (from above)			10,000	10,100
Cost per Equivalent Unit		$31.05	$15.00	$16.05
Costs Assigned (or Output):		**Total Costs**	**Transferred Out**	**Ending WIP**
Beginning WIP Costs		$25,272	$25,272	
Conversion Costs: To Complete Beginning WIP [(1,000 - 600) x $16.05]		6,420	6,420	
Units Started & Completed This Period [8,500 x $31.05]		263,925	$263,925	
Ending WIP Direct Materials		22,500		$22,500
Ending WIP Conversion Costs [1,200 x $16.05]		19,260		19,260
Total Costs Assigned (Output)		$337,377	$295,617	$41,760

* Assume materials are added at the beginning of the process and conversion costs are added evenly throughout the process.

REFERENCES

Ahadiat, N. (2008). "In Search of Practice-Based Topics for Management Accounting Education," *Management Accounting Quarterly* 9(4) 42-54.

Atkinson, A. A., Kaplan, R. S., Matsumura, E. M., & Young, S. M. (2007). *Management Accounting.* Pearson Prentice Hall: Upper Saddle River, NJ., 104.

Balakrishnan, R., Sivaramakrishnan, K., & Sprinkle, G. B. (2009) *Managerial Accounting;* John Wiley & Sons, Inc.: Hoboken, NJ.

Blocher, E., Stout, D. E., Cokins, G., & Chen, K. H. (2008). *Cost Management: A Strategic Emphasis.* McGraw-Hill Irwin: New York, NY.

Braun, K. W., Tietz, W. M., & Harrison Jr., W. T. (2010). *Managerial Accounting.* Pearson Prentice Hall: Upper Saddle River, NJ. 241, 251.

Brewer, P. C., Garrison, R. H., & Noreen, E. W. (2005). *Introduction to Managerial Accounting.* McGraw-Hill Irwin: New York, NY

Easton, P. D., Halsey, R. F. McAnally, M. L. & Hartgraves, A. (2008). *Financial & Managerial Accounting for MBAs.* Cambridge Business Publishers

Edmonds, T. P., Tsay, Bor-Yi & Olds, P. R. (2009). *Fundamental Managerial Accounting Concepts*. McGraw-Hill Irwin: New York, NY. 550.

Eldenburg, L. G., & Wolcott, S. K. (2005). *Cost Management: Measuring, Monitoring, and Motivating Performance*. John Wiley & Sons, Inc: Hoboken, NJ.

Hansen, D. R., Mowen, M. M., & Guan, Liming (2009). *Cost Management: Accounting and Control.* South-Western Cengage Learning: Mason OH.

Heisinger, K. (2010). *Essentials of Managerial Accounting.* South-Western Cengage Learning: Mason, OH. 162.

Hilton, R. W. (2009). *Managerial Accounting: Creating Value in a Dynamic Business Environment*. McGraw-Hill Irwin: New York, NY. 140, 141.

Hilton R. W., Maher, M. W., & Selto, F. H. (2008). *Cost Management: Strategies for Business Decisions.* McGraw-Hill Irwin: New York, NY. 304.

Horngren, C. T., Datar, S. M., Foster, Madhav, G., Rajan, V., & Ittner, C. (2009). *Cost Accounting: A Managerial Emphasis*. Pearson Prentice Hall: Upper Saddle River, NJ. 640.

Horngren, C. T. & Harrison, Jr., W. T. (2007). *Accounting*. Pearson Prentice Hall: Upper Saddle River, NJ.

Jackson, S. R., Sawyers, R. B. & Jenkins, J. G. (2009) *Managerial Accounting: A Focus on Ethical Decision Making.* South-Western Cengage Learning: Mason, OH.

Jiambalvo, J. (2007). *Managerial Accounting*. John Wiley & Sons, Inc: Hoboken, NJ.

Kinney, M. R., & Raiborn, C. A. (2009). *Cost Accounting: Foundations and Evolutions.* South-Western Thompson: Mason OH.

Larson, K., Wild, J. & Chiappetta, B. (1999). *Fundamental Accounting Principles.* Irwin McGraw-Hill.

Mowen, M. M. & Hansen, D. R. (2008). *Cornerstones of Managerial Accounting.* South-Western Thompson: Mason OH.

Noreen, E. W., Brewer, P. C. & Garrison, R. H. (2008). *Managerial Accounting for Managers.* McGraw-Hill Irwin: New York, NY

Oliver, M. S. & Horngren, C. T. (2010). *Managerial Accounting.* Pearson Prentice Hall: Upper Saddle River, NJ.

Pollard, M., Mills, S. K. & Harrison, Jr., W. T. (2007). *Principles of Accounting*. Pearson Prentice Hall: Upper Saddle River, NJ.

Swain, M. R., Albrecht, W. S., Stice J. D. & Stice E. K. (2005). *Mangement Accounting*. South-Western Thompson: Mason OH.
VanDerbeck, E. J. (2005). *Principles of Cost Accounting.* South-Western Thompson: Mason OH.
Warren, C. (2009). *Survey of Accounting.* South-Western Cengage Learning: Mason OH.
Warren, C. S., Reeve, J. M. & Duchac, J. E. (2009a). *Accounting.* South-Western Cengage Learning: Mason OH.
Warren, C. S., Reeve, J. M. & Duchac, J. E. (2009b). Managerial *Accounting.* South-Western Cengage Learning: Mason OH. 100.
Weygandt J. J.., Kimmel, P. D., & Kieso, D. E. (2009). *Accounting Principles.* John Wiley & Sons Inc: Hoboken, NJ.
Weygandt J. J., Kimmel, P. D., & Kieso, D. E. (2008). *Managerial Accounting:, Tools for Business Decision Making.* John Wiley & Sons, Inc: Hoboken, NJ. 105.
Wild, J. J., Larson, K. D., & Chiappetta, B. (2008). *Fundamental Accounting Principles.* McGraw-Hill Irwin: New York, NY. 809.