

REGAIN RELEVANCE IN A COST MANAGEMENT ACCOUNTING COURSE WITH SAP

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ABSTRACT

The objective of this paper is to describe the integration of SAP (Systems Application and Process), the leading ERP (enterprise system) software, in a cost management accounting course. SAP makes a useful vehicle for introducing cost management accounting students to integrated accounting system structure because it is based on 'best practice' in cost management system design. Thus, the conceptual framework underlying the financial modules of SAP provides a universal introduction to the use of accounting system structure to access, develop, and distribute information for decision support and performance evaluation for the organization's strategic management team.

INTRODUCTION

Evidence in the literature suggests that a gap exists between needed information technology (IT) skills and business education (Chandra et al 2006; Hayen et al. 2000). In particular, the increasingly widespread use of Enterprise software (ERP) in organizations has prompted educators to realize the need to introduce ERP software in the business curriculum (Gupta and Marshall 2010; Cannon et al. 2004). The objective of this paper is to describe the integration of SAP (Systems Application and Process), the leading ERP system, in a cost management accounting course.

It's important to note that the information technology (IT) learning objectives for cost management accounting students differs from the objectives for IT students. While the latter needs to understand the underlying configuration complexity of the system, a cost management student's important skills arise from a system 'user' perspective. Courses for IT students include technical skills such as the underlying configuration of an organization, or even creating an organization from scratch. But few cost management accountants will encounter a need for these skills. To be a power user, cost management accountants require an understanding of the system structure in the organization *as it exists* and an understanding of the conceptual framework on which the system is built. Cost management accountants need a clear understanding of how to create relevant master data, such as cost/profit centers and cost elements (accounts), and to access and distribute decision support and performance evaluation information to managers.

Little support for system understanding is provided in mainstream cost management textbooks. Evidence in the literature suggests that our textbooks continue to portray cost management accounting systems as they existed decades ago (see, for example, Chandra et al 2006). Informal surveys in my cost management classes suggests that many students view the topical coverage in mainstream cost management textbooks as a series of disjointed and

haphazard topics. Gupta and Marshall (2010), for example, find that current accounting textbooks focus on low-order skills and fail to address higher-order cognitive skills needed in today's practicing accountants, among which is the use of technology. Moreover, Fisher (2006) notes that significant changes have been made in management accounting practice but management accounting texts continue to present 'transaction-based' accounting systems rather than the holistic structure found in today's ERP systems which are designed to monitor an integrated organizational value chain (Johnson et al. 2004). David et al (2003) note that the conservative nature of publishers and the cost of integrating new material in texts inhibits wholesale changes in textbooks. Beyond the weaknesses in textbooks, cost management course structure seems similarly lacking. Cable et al (2009) argue that management accounting curricula fail to provide the IT skills needed to students to meet managers' needs for decision support. Ahadiat (2008) similarly proposes that revisions in curricula is need to better prepare accounting graduates for practice.

Overall, it is difficult for students to weave together a cohesive view of system structure, as present in ERP systems, based on our mainstream cost management textbooks and course content (Corbitt and Mensching 2000). Students continue to have difficulty applying the concepts they learn in a cost management course to the sophisticated systems they encounter after graduation unless cost management courses take up the challenge to introduce ERP to students. In my experience, former students with a good textbook understanding of cost management concepts find themselves baffled when they access the complex systems they find in their workplace (David et al. 2003). Unfortunately, as argued by Tatikonda (2004) current accounting education has become a roadblock to preparing management accountants for the workplace.

The SAP system provides an effective vehicle to introduce cost management accounting students to integrated accounting system structure because it is based on 'best practice' in cost management system design. Thus, the conceptual framework underlying the financial modules of SAP provides a universal introduction to the use of accounting system structure to access, develop, and distribute information for decision support and performance evaluation to the organization's strategic management team. System structure in SAP is not unique. Rather, it is representative of ERP system structure in general. Once students understand system structure in SAP, they can readily adapt to other ERP systems by simply learning the unique terminology in that system.

Classroom explanations of system design are inadequate to provide an understanding of the conceptual framework underlying an ERP system (Fedorowicz et al. 2004). Hands on experience with the system is needed to provide problem oriented learning (Winkleman and Leyh 2010). By activating classroom knowledge as students work on configuration problems on the SAP system, students acquire long term understanding of cost management concepts and system structure. Follow-ups with individual students after graduation and employer feedback indicate that students are better able to apply their conceptual body of cost accounting knowledge as a consequence of their exposure to 'big system' accounting on SAP.

BASICS OF COST MANAGEMENT COURSE DESIGN WITH SAP

The development of my cost management SAP exercises began with site visits to several local SAP user companies to discuss needed skills for new hires in cost management accounting roles. From these discussions, I developed a series of handouts, exercises, projects, and assessments, as described below.

In developing the course, my goal was to integrate cost management accounting concepts with hands-on business scenarios on the SAP system. Thus, concepts taught on the blackboard were concurrently illustrated and reinforced in SAP exercises (see, for example, McCombs and Sharifi, 2003). However, there is a pedagogical balance needed to ensure that CPA topics are effectively taught along side the higher-order understanding needed for the SAP system. Since much of the CPA exam is a textbook-based exam, many of the mechanical calculations found in textbooks will be needed by students for the CPA exam.

The sap system ships with a sample multinational organization called the IDES Company. It is designed for corporate training so it has been criticized for academic instruction (Johnson et al. 2004), but I have found the IDES company to be adequate to illustrate the fundamental organizational structure in a multi national company. It avoids the need to configure an entire organization from scratch by providing the structure for students to configure needed master data, such as cost centers, profit centers, cost elements (accounts), and other cost objects. Such master data creation is a routine task for cost management accountants and useful for system understanding.

LESSONS LEARNED

Instructor Support

While SAP itself provides extensive education classes for system users, direct education from SAP for many faculty is unlikely to be a viable option. The courses are quite expensive and require on-site attendance for several days. Moreover, the classes are intended to support business staff in specific business roles. These roles do not fit well into a course sequence for a cost management class. Substantial customization would be needed to adapt the content for the accounting classroom.

Support is also available from the SAP University Alliance (UA). The Alliance, begun in 2001, provides a range of support options on their web site. Even plug and play modules for various disciplines are available. Summer and Winter-break workshops sponsored by the UA are offered at several locations across the US and Canada. The workshops are typically several days in length (Becerra-Fernandez et al 2000).

A local SAP installation is not necessary to use the system (or even supported by SAP). University Competency Centers have been established across the US by the UA and provide reliable on-line access to the system.

Student Reactions

Students often resist the rather unyielding structure of a complex system like SAP. My experience, and evidence in the literature, suggests that accounting students are not used to technology (Chandra et al 2006). Cable et al (2009), for example notes that most accounting instruction is based on spreadsheets and paper and pencil exercises. Students in my cost management classes have had little experience with the methodical and careful procedures needed to master complex systems like SAP. In fact, many students have mentioned to me that learning the systematic *discipline* needed to be successful on a complex system, like SAP, is a valuable new skill that they haven't needed in prior education experiences.

Students also have difficulty linking textbook concepts to the practical environment in SAP. For example, since SAP reports don't present data in textbook format, applying even well understood tools like cost-volume-profit or tactical decision making to the SAP environment require students to apply critical thinking skills to interpret, analyze, and evaluate information. Pushing students to take advantage of learning opportunities without causing excessive frustration can sometimes be a difficult balance. I have often heard the frustrated comment, "can you just tell me what to do?"

Supervised time in the PC lab is needed to reduce the frustration that occurs when students lose their way in exercises. Given system complexity, students can occasionally find themselves with errors that the instructor may not have encountered before. This can be an additional challenge.

Integrating the SAP system with the content in cost management texts can be a challenge given the failure of textbooks to describe realistic cost management system structures. Such ambiguity can lead to student uncertainty and even resentment. I have found (very) brief handouts linking textbook content with each SAP exercise to be a useful supplement as students work on the system. I have also been able to motivate students to appreciate the need for system understanding using guest speakers. I find the business community to be happy to speak to students about the need to understand the systems they'll be seeing on the job.

Have Realistic Expectations

Faculty considering moving to SAP in a cost management course should be prepared for a substantial time investment. Both in preparing exercises and support material and in time required for student support when the class begins. Explicit step-by-step directions are needed because the SAP interface, like typical ERP systems, is not intuitive. Students need careful instruction to become accustomed to the command structure and to system navigation.

A common students frustration occurs when they go astray on an exercise and find that it is not possible to simply delete everything and start over. It's not unusual to receive an email from students saying, "I made a mistake, how do I delete what I did so I can start again?" Of course, that's typically not possible since the system has audit checks that prevent simply wiping out transactions and master data. Errors must be corrected, not deleted. This is often a revelation for students but still a source of acute frustration. Leading students to finding a workaround for

these mistakes requires one on one support. I have had success organizing a useful support structure by requiring a rotating group of 2-3 students to complete each exercise early. This group then prepares a brief (10-15 minute) classroom presentation highlighting potential pitfalls for the exercise. This group is then tasked with being available as a resource to the rest of the class on student discussion forums.

Assessment and Evaluation

Student assessments should be carefully designed before course implementation. Assessments should be focused on performance along two dimensions, conceptual understanding of system design and technical configuration effort. The intent is to make students power users of the system.

Several assessment opportunities are available. Sequential assessments and deadlines are needed to encourage students to avoid procrastinating till the last minute. As argued by David et al (2003), students often lack the discipline to be responsible for self-directed learning so each assignment needs to be accompanied by serial assessments to help direct and monitor student progress.

I have found success with three interrelated assessments. First, a series of open-ended questions distributed with each exercise prior to class provide a framework for class discussion for each exercise. Much like the discussion of an instructional case, student contributions to the class based on these questions provides a basis for assessment and ensures student engagement in learning. Second, I provide a series of (randomized) on-line quizzes with objective questions administered through a course management system (D2L). Students are able to complete quizzes on their schedule, but deadlines are set to ensure timely progress through the SAP exercises. Finally, student progress can be directly assessed on the SAP system based on success in completing each exercise.

THE LEARNING STRATEGY: STUDENT ENGAGEMENT AND INTERACTION THROUGH EXERCISES AND PROJECTS ON THE SAP SYSTEM

Accounting in SAP is provided in several modules, the two most relevant are SAP-FI and SAP-CO. The former primarily provides access to financial accounting (GAAP) reporting functions. The SAP-CO module is the responsibility accounting system for internal reporting and is the primary focus for a cost management course. Within SAP-CO resides functionality for cost centers (SAP-CC), profit centers (EC-PCA), and product cost (SAP-PC). Assignment strategy is summarized in Table 1 and described in detail below. Sample discussion questions for each part are listed in Table 1.

Table 1 Summary of SAP Assignments
<p>1. Introduce the Controlling Module (SAP-CO) Access existing SAP-CO reports to review the configuration for various master data, such cost centers, profit centers, accounts (cost elements), and cost drivers (activity types). Sample discussion questions:</p> <ol style="list-style-type: none"> 1. Describe the organizational structure in SAP-CO. 2. Describe the two-stage responsibility accounting system. How does it differ for service and manufacturing companies? 3. How are cost driver (activity type) rates calculated and how are cost drivers used to assign cost to cost objects? 4. How are profit centers used in SAP-CO? Draw a diagram of cost flows.
<p>Part 2. Configuration and Planning in the Controlling Module (SAP-CO) A. Create master data in SAP-CO. Include service/support departments, line departments, profit centers, cost center groups, cost drivers (called activity types, ATs), cost elements (accounts) B. Proceed with planning of cost center outputs, directly-traced inputs (cost), centrally planned items, such as personnel benefits, and resources used by line cost centers from service/support cost centers. Sample discussion questions:</p> <ol style="list-style-type: none"> 1. Explain how activity types (cost drivers) are used and how cost elements (accounts) are linked to activity types. 2. Define and describe the following terms and concepts: cost center group, cost center hierarchy, business area, profit center group, cost element category. 3. Explain the planning sequence in SAP. 4. Review the cost center reports and the planning steps to explain the calculations underlying each line item in the cost center reports.
<p>Part 3. Posting Transactions. Post actual transactions and carry out actual cost assignments, including actual external expenditures (directly-traced cost) and actual resources used by line cost centers from service/support cost centers. Sample discussion questions:</p> <ol style="list-style-type: none"> 1. How is the over- under-applied amounts in each of the cost center reports calculated? Explain both the debit and credit amounts. 2. Explain the calculations for the cost assigned to user cost centers when they use resources from other cost centers. Be sure you understand the line items in both the sender cost center and the user cost center. 3. Explain how cost centers and profit centers are linked in the system.
<p>Part 4. Output Cost in the Product Cost Module with Two-Stage and Activity-Based Costing Review of configuration for an existing product cost estimate and an existing production order. Then configure a cost estimate based on the students' own cost centers. Finally, adjust product cost estimate by including cost from ABC pools. Sample discussion questions:</p> <ol style="list-style-type: none"> 1. Review the responsibility accounting report for your production cost center. Identify the cost driver used to apply cost to production orders and calculate the cost driver rate. 2. Explain the journal entry made by the system for the cost assigned to the production order from your production cost center. 3. Explain how adding cost from ABC cost pools can improve the product cost estimate. 4. Explain the components of a product cost estimate. How are the three cost components, direct material, direct labor, and production overhead represented in the SAP cost estimate?

Part 1. Introduce the Controlling Module (SAP-CO)

As mentioned above, students have difficulty connecting textbook concepts to system processes and students often fail to see the holistic system structure found in ERP systems. Thus, the first part is a review of reporting in SAP-CO within the existing structure of the IDES multinational company. The objective is to allow students to connect classroom understanding with the system reporting they see in the system. For this part, no configuration is required by students. They are simply required to access existing SAP-CO reports in IDES to review the configuration for cost centers, profit centers, accounts (cost elements), and cost drivers (activity

types). As they proceed, the links between the SAP reporting structure and classroom concepts become apparent to students. I ask them to review the reports and apply familiar cost management concepts, such as cost-volume-profit, cost behavior, and tactical decision making. An important component in part 1 is to review 'drilldown' functionality to view underlying transaction details for line items and to access customized reports for cost centers and profit centers.

I have found that with classroom examples derived from the SAP system, students begin to get a holistic view of the cost flows in a responsibility accounting system as they progress through this exercise. SAP-CO is a prototypical two stage responsibility accounting system. The total cost of any cost center includes directly-traced cost plus the cost of resources assigned from other cost centers. A cost driver must be configured for every cost center to complete the cost assignments from 'sender' to 'user' of internal resources. Every cost center has at least one cost driver. The cost driver is the value-added ('work done') by the cost center and the cost driver 'causes' cost to be incurred in the cost center. Thus, transactions for directly traced cost appear as line items in SAP responsible cost center reports along with line items arising from the (stage 1) cost assignment of internal resources acquired from 'sender' cost centers. Finally, in stage 2, the cost from line cost centers is assigned to products and services sold to customers based on the line department's cost driver. The stage 2 cost assignment is the manufacturing overhead account shown in textbooks for production settings, although the cost assignment from line departments to output (products and services sold to customers) must occur in service companies as well as manufacturers.

Part 2. Configuration and Planning in the Controlling Module (SAP-CO)

After students have been introduced to SAP system structure in part 1 using the existing configuration in the IDES Company, students are ready to begin creating master data and to proceed with the planning function. The first step is to create needed master data. I have found that a successful approach is to ask students to create and configure 4 cost centers and 2 profit centers. Two of the cost centers are service/support departments and the other two are line departments. The profit centers are linked to the two line departments so the cost centers can be linked to revenue from the sales system for measurement of income and return on investment. Other needed master data is cost center groups, cost drivers (called activity types, ATs) for each cost center, and relevant cost elements (accounts) for input and output transactions (cost assignments). So the students don't over-write each other's master data, each student can be assigned a student number to append to master data names.

Once master data is created, students can proceed with planning. Cost center outputs, which are the cost drivers (ATs) of each cost center, are planned, along with directly-traced inputs (cost). It is useful to also have students plan centrally planned items, such as personnel benefits. The next planning requirement is to plan resources (cost drivers) used by line cost centers from service/support cost centers so the system can calculate cost driver rates and proceed with plan (stage 1) cost assignments.

Part 3. Posting Transactions.

After completing the configuration and planning in part 2, students are ready to post actual transactions and carry out actual cost assignments. Students begin by posting actual external expenditures (directly-traced cost) to their 4 cost centers. At this point, most students first realize that all external expenditures (transactions) do not go directly to (GAAP) financial statements but must be first assigned to a responsibility area and then aggregated for financial statements. Next, students can enter actual resources (cost drivers) used by line cost centers from service/support cost centers so the system can complete actual, period-end, cost assignments based on plan rates from part 2.

Part 4. Output Cost in the Product Cost Module with Two-Stage and Activity-Based Costing

The final part allows students to understand how cost is assigned to output. Students begin with a review of configuration for an existing product cost estimate and an existing production order already configured in the IDES company. At this point, it is useful to ask students to use the product cost estimate to review some of the decision support tools from earlier text book study. Potential problems include, for example, target profit estimates, incremental cost calculations, and various transfer pricing decisions. This results in a thorough understanding of the components of a product cost estimate.

The next step is to configure a cost estimate based on the students' own cost centers. This is a traditional two stage cost estimate. In stage 1, the cost from the students' service/support departments is assigned to line departments and in stage 2, cost from students' line departments is assigned to their product cost estimate (along with directly-traced direct material cost). Finally, this product cost estimate can be adjusted by including cost from ABC pools. ABC pools are created and the product cost is adjusted to better reflect resource use and improve product cost estimates.

CONCLUSION

Integrating SAP into a cost management accounting course, offers several useful learning outcomes. First, it provides the opportunity to introduce students to the 'abstract language' of business systems. In addition, the use of problem based learning with up to date business tools improves long-term retention of cost management concepts and is invaluable for student learning (Davis and Comeau 2004; Moody 2003). Finally, integration of SAP into the cost management accounting course provides the following additional benefits.

- Provides an opportunity to study and understand state-of-the-art integrated, cross-functional, business process modeling with advanced technology.
- Allows classroom instruction to be supplemented and reinforced with hands-on exercises using sophisticated software.
- Provides an opportunity to work within a multi-national enterprise seamlessly integrating reporting and controlling.

- Increases marketability for our graduates. Employers value the increased understanding of business processes developed through work on the SAP system.

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