

# Integrating a Comparison of Enterprise Resource Planning (ERP) and Accounting Software into the Accounting Information Systems Course

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**Abstract:** Accounting students upon graduation are likely to encounter accounting software applications when they enter the workforce. Two common types are general ledger (GL) systems and enterprise resource planning (ERP) systems. These systems have significant built-in internal control differences. Therefore it is advantageous to integrate both systems into an accounting information systems (AIS) course so comparisons can be made. This paper discusses issues involved in integrating both into an AIS course. Included is a brief background on the projects, the process of converting an existing ERP project into a new GL project, the problems encountered, and resolutions of issues encountered.

**Key words:** accounting information systems; ERP, internal control **JEL codes:** M40, M41, M49

# 1. Introduction and Background

Many accounting majors, especially traditional students, have limited experience in the work force and thus lack background knowledge of business processes and the application of internal controls. These topics are typically subject matter included in the accounting information systems (AIS) course. The AIS course is a relatively recent addition to most accounting curriculums without topic standardization (Vatanasakdakul, 2011). Therefore there has been volatility and change in topic coverage depending on the instructor, textbook, and auxiliary materials used (Doost, 2002). There have been calls that students should become proficient in using information systems and technology, including those similar to systems students will encounter in their professional careers (AAA, 1986; IAESB, 2014). As a result many AIS courses have integrated the use of various software that may be relevant to the students' future careers such as Quickbooks, MYOB, Peachtree+, Access, and spreadsheets (Vatanasakdakul, 2011; Doost, 2002). In 2012 the American Institute of CPAs' CPA Vision Report included a need for professional accountants to be "Technologically Adept" (AICPA, 2012).

For several years the author's AIS course incorporated accounting software in the form of Quickbooks<sup>1</sup> by Intuit or Peachtree+<sup>2</sup> in the course materials to introduce students to a form of computerized accounting. These packages present the accounting information system in a manner similar to the journal and general ledger systems

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<sup>&</sup>lt;sup>1</sup> Quickbooks is a product and registered trademark of Intuit, Inc.

<sup>&</sup>lt;sup>2</sup> Peachtree+ was a product of Sage Corporation. No longer available, it has been replaced by Sage 50 software. For more on Peachtree see http://conservancy.umn.edu/bitstream/11299/107274/1/oh382bd.pdf.

the student had already been exposed to in earlier courses. Thus students completed the accounting cycle manually and also using accounting software. A study by Boulianna (2014) indicated students experienced better knowledge acquisition of the accounting cycle doing both. Recently an effort has been made to integrate Enterprise Resource Planning (ERP) systems into the business curriculum, in particular systems provided by SAP since the School of Business is part of the SAP University Alliance. In that regard, projects using SAP software were chosen to replace those using Quickbooks or Peachtree. Following this first year of using SAP the author decided to incorporate both SAP and the previously used software to provide a comparison for the students. This is thought to be similar to the manual/software knowledge experience and should improve students' knowledge acquisition. The initial year a project was used based on a case from the SAP University Alliance developed for supply chain management. While adequate, it did not address some issues relevant for an AIS course.

A different project called Classic Rockers<sup>3</sup> developed by Ronny Daigle, FawziNoman, and Ross Quarles at Sam Houston State University (which is available through the SAP University Alliance) was then chosen to use in the course. Classic Rockers was developed specifically for use in an AIS course. A decision was made to convert the data from that project to also use in a second project using general ledger based accounting software. This would provide the students with some basic use of two commonly used systems, one with high integration and strict built-in controls and one with relatively moderate integration and controls. Students should be able to compare the two based on course concepts. Initially Quickbooks was used but due to licensing issues Sage 50<sup>4</sup> has been used in subsequent semesters.

## 2. SAP University Alliance

The SAP University Alliance (http://scn.sap.com/community/uac) is an organization, supported by SAP SE.SAP SE is a German company which produces and markets several software products for Enterprise Resource Planning. The SAP University Alliance is an organization of colleges and universities which support the use of SAP software for instructional purposes. U.S. members of the alliance have access to the enterprise software which is hosted by one of two sites in the U.S., the University of Wisconsin-Milwaukee or at California State University-Chico. Two features of the alliance are relative to its use in the classroom. One, faculty at several alliance universities have developed projects that are available to other faculty at alliance universities to use in college courses. Two, access to SAP software is available from one of the two hosting sites for use by faculty for instructional purposes. The host site for the project in this paper was California State University-Chico. The complexity of SAP software makes it difficult for individual universities, especially those with limited resources to self-host the systems. Having hosting sites for multiple universities to use simplifies the maintenance of the software. Faculty at an alliance member school wishing to use SAP software have their coordinator arrange for "clients" to be created for a particular "company" in SAP. Each student is then assigned a client that is used for access, through a Graphical User Interface (GUI), to the software. This access is identical to a user in a real company that uses SAP software. Different project clients will have different client configurations.

<sup>&</sup>lt;sup>3</sup> Classic Rockers was developed by Ronny Daigle, Fawzi Noman, Rosss Quarles at Sam Houston State University and is available through the SAP University Alliance

<sup>&</sup>lt;sup>4</sup> Sage 50 is a product and registered trademark of Sage Software, Inc.

# 3. Converting the SAP Project to Sage 50

Familiarity with the Classic Rockers project was required in order to do a conversion to Sage 50. It may seem obvious, but that required the author to complete the project in SAP which was also necessary before the project could be included in the course. The project has two sets of materials. The first is an overview of SAP and internal control concepts, essentially a textbook on business processes, internal control, and how they are incorporated into the SAP software. The second contains detailed instructions on executing the project in SAP.

Classic Rockers is a case where students execute in SAP the processes of configuring a product (in this case rocking chairs) planning and purchasing materials for the product, and accounting for the production and sales for the product. The chapters in the textbook provide conceptual background for business processes and related internal controls which coincide with the detailed instructions to accomplish each process. Students first create vendor and material master records (SAP process MM). Then they progress through the purchasing cycle including creating purchase requisitions and related electronic documentation. Next is SAP's Production Logistics (PP) where a bill of materials is created and materials requirement planning processes are performed. Manufacturing and order completions are also processed. The processes involved in sales are then executed (SAP process SD) including creating customer profiles, creation of sales views and prices for parts and finished goods. Customer service processes such as customer inquiry, sale orders, delivery documentation and customer billing are also done at this time. The final modules (SAP processes FI and CO) then provide insight for the student into some of the accounting records and reports including portions of the general ledger, accounts payable, accounts receivable, and inventory.

The Sage 50 project consisted of two basic components, setup and transactions. In the setup component students are provided with detailed instructions to create a new company in Sage 50, create general ledger accounts for the company, and enter opening balances for selected accounts. Vendor and customer accounts are created. Inventory items for materials and finished goods are also entered including bill of materials for each product. To record labor costs employee records are created. It was in developing this portion of the Sage 50 project that it was noted that the SAP Classic Rockers project did not include a full chart of accounts nor employee records. Curiously Classic Rockets was a manufacturing concern without any property, plant, equipment or employees. However, those were irrelevant to the SAP project and in the real world would have already existed in the system; so it was not surprising to find these elements missing. Below is the table of contents used for Sage 50.

Account ID	Account Description	Active?	Account Type
1000	Cash	Yes	Cash
1500	Accounts Receivable	Yes	Accounts Receivable
2000	Inventory - Raw Materials	Yes	Inventory
2002	Inventory-Trading Goods	Yes	Inventory
2012	Inventory-WIP	Yes	Inventory
2014	Inventory-Supplies	Yes	Inventory
2100	Inventory-Finished Goods	Yes	Inventory
2800	Property, Plant, and Equipment	Yes	Fixed Assets

Table 1	Chart of Accounts
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(Table 1 to be continued)

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(Table 1 continued)			
3000	Accounts Payable	Yes	Accounts Payable
3020	Federal Withholding	Yes	Other Current Liabilities
3025	State Withholding	Yes	Other Current Liabilities
3500	Long Term Liabilities	Yes	Long Term Liabilities
5000	Common Stock - No Par Value	Yes	Equity-doesn't close
5800	Retained Earnings	Yes	Equity-Retained Earnings
6000	Sales Revenue	Yes	Income
6400	Sales Discount	Yes	Income
6500	Service Sales Revenue	Yes	Income
7000	Cost of Goods Sold	Yes	Cost of Sales
8000	Operating Expenses	Yes	Expenses
8050	Admin. and Sales Salaries	Yes	Expenses
8100	Payroll Clearing	Yes	Expenses
9000	Other Gains and Losses	Yes	Expenses

To balance the general ledger additional accounts were included, arbitrary amounts were entered for beginning balances, and "employee" records<sup>5</sup> were created with arbitrary labor rates to simulate the labor costs included in Classic Rockers. Developing the information and the detailed instructions for students to create the new company in Sage 50 and its components were the most significant time consuming issues for the instructor in this portion of the project. Below are additional tables with setup information.

## Table 2 Employees

Employee ID	Employee	Fed Filing Status	Рау Туре
E0400123	Baily Quarters	Single	Salaried
E0400124	Johnny Caravella	Single	Hourly
E0400125	Les Nessman	Single	Hourly
E0400126	Andy Travis	Single	Salaried
E0400127	Herb Tarlek	Married	Salaried

### Table 3Inventory Items

Item ID	Item Description	Item Class	Active?	Item Type
Cushion	Cushion for Rocker	Stock item	Active	Raw & Op
Finished Rocker	Finished Rocker	Assembly	Active	Finished
Labor Cushion	Labor for placing cushion	Labor	Active	Raw & Op
Labor Gluing	Labor for gluing	Labor	Active	Raw & Op
Labor Sanding	Labor for Sanding	Labor	Active	Raw & Op
Rocker WIP	Rocker in Profess	Assembly	Active	WIP
Wood Kit	Wood Kit for Rocker	Stock item	Active	Raw & Op

<sup>&</sup>lt;sup>5</sup> Names for employees were taken from an old sitcom from the late 1970s and early 1980s. Not a single student commented on the names which probably is more of a reflection of the age of the professor than of any lack of knowledge of the students.

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Item ID	Item Description	Qty Needed	Est Cost
Finished Rocker	Finished Rocker		
. Rocker WIP	Rocker in Profess	1.00	
Wood Kit	Wood Kit for Rocker	1.00	35.00
Cushion	Cushion for Rocker	1.00	25.00
Labor Sanding	Labor for Sanding	1.25	16.25
Labor Gluing	Labor for gluing	2.00	36.00
Labor Cushion	Labor for placing cushion	0.10	1.60
Finished Rocker Total			113.85
Rocker WIP	Rocker in Profess		
. Wood Kit	Wood Kit for Rocker	1.00	35.00
. Cushion	Cushion for Rocker	1.00	25.00
. Labor Sanding	Labor for Sanding	1.25	16.25
. Labor Gluing	Labor for gluing	2.00	36.00
. labor Cushion	Labor for placing cushion	0.10	1.60
Rocker WIP Total			113.85

Table 4 Bill of Materials

The second component of the Sage 50 project was entering transactions to acquire the materials, manufacture rockers, and record sales. Instructions walk students through example transactions then require students to record similar transactions for additional transactions. This portion of the project was relative simple since detailed transactions were part of the SAP Classic Rockers case. The instructor's efforts were primarily converting the instructions for SAP to those illustrating the same, or similar, activity in Sage 50. In both components students were periodically instructed to create files of printouts to submit for grading as was also done in the SAP Classic Rockers case.

## 4. Expected Student Learning Outcomes

Using the same basic scenario of a manufacturing company but having students use two different types of software systems has multiple objectives related to the course. Some graduates from this university enter into careers with large multinational corporations; others have careers in small and medium size businesses. Exposure to two very different software systems provides both groups with experience working with software similar to what they may use in the future. In fact that was a primary reason for originally using Quickbooks in the course; employers were seeking employees who had used that particular software. SAP is also an ERP system used by many companies recruiting students at this university.

Another purpose of these two projects is to have the students compare the internal controls, or lack thereof, in the two systems. SAP has extensive controls built into the system including some that due to the nature of it being a classroom project the students are not exposed to. For example, in an actual company one person would not be able to perform all the SAP functions the student performs in the project due to segregation of duties and access controls. However, students do have to deal with other controls in SAP such as not being able to delete or edit a transaction once it is saved. To correct errors students must use an additional correcting transaction. On the other hand, as configured for the project which is the Sage 50 default, transactions in Sage 50 can be deleted or edited after entry. Discussions led by the instructor comparing the controls were included in the course, either in class or online discussion forums. One of the questions students were asked was which system they preferred. Almost all

students indicated they liked Sage 50 with the reason being they could easily correct their errors. However when it was pointed out that in the real world this would also allow a fraud perpetrator to cover up a theft many reconsidered their answer.

## 5. Issues with the Projects

One issue with any project of this nature is how to avoid the "monkey see, monkey do" directions where the student performs a process but does not gain an understanding of what they have done. This is a problem the author has identified with many commercially available products incorporating software into a course. Carefully determining the objectives of the project helps in this regard. Activities that are necessary only to set the environment can be identified and implemented using detailed instructions. Activities related to the objectives can be introduced using detailed instructions followed by similar activities requiring the student to understand the process involved. The authors of Classic Rockers use that approach and the Sage 50 project was also designed in that manner. Setup activities have detailed step-by-step instructions which do not require comprehension of what is being done, while other activities are introduced with examples followed by basic data to be acted on by the student.

Identifying project results that can be used for assessment of the student's work is also typically a problem with projects of this nature. The authors of Classic Rockers instruct students at several times during the project to print items to submit. Since this course is sometime taught on-line all students are required to download a free driver to print to a .pdf file then send those files to be graded. Sage 50 will export reports in an Excel<sup>6</sup> format. Instructions for that project include times when the student is directed to create a report, export it to a spreadsheet and submit it to the instructor for grading. Instructions for both include a standardized filename format which includes the student's name.

A major issue with the SAP project was discovered one semester. Most SAP University Alliance projects are designed where a single company instance is used with multiple users. Each student is assigned a separate "client" number which is appended to the end of various items as they are created. For example to set up a vendor the student is instructed to create a vendor with the name "Turned Spindles, Inc.\_\_\_" where the "\_\_\_" is their assigned unique three digit client code. This is used to separate each student's work. For multiple semesters no problems were associated with this method of separating student work. However, one semester a student "discovered" how to inquire the system and finding already existing vendors with that name decided to use an existing one instead of creating her own. She then proceeded to do so with other items throughout the project. If she had used the same code throughout the project this probably would have only affected one other student and the instructor probably could have worked around the issue when grading student work. Unfortunately, she used several different student codes throughout the project. The instructor was inundated with several students having issues working through the project instructions. It was only after tracing several transactions to the login ID responsible that the issue was identified. By that time so many students had been affected that the entire project had to be canceled for the semester. Subsequent semesters included better instructions for students as to the purpose of the client number assigned and sever penalties for anyone not using their own assigned code. Other solutions are also being contemplated.

The issue of students accessing other student's work was also possible in the Sage 50 project but the lesson

<sup>&</sup>lt;sup>6</sup> Excel is a product of Microsoft Corporation.

was learned and measures were taken to prevent it. When use of accounting software was first incorporated into the course each student was required to purchase, bundled with the book, either Peachtree+ or Quickbooks and install the software on their personal computer. For students with incompatible personal computers the software was also installed under a site license agreement in an on-campus computer lab. Files saved on computer lab equipment were removed each night so students using the lab maintained files on removable media. Since each student stored files separately cross-contamination of projects was not an issue. In 2013 the University moved to cloud based applications for all students. All students are provided with the same applications and access regardless of whether they attend face-to-face classes on the main campus, at a satellite campus, or participate in online courses. This created licensing issues with some vendors most of which have been resolved. It also provided unique opportunities on how to configure an application such as Sage 50. Working with the University's technical support staff the cloud environment for Sage 50 was configured so each student has a unique virtual machine for the application which is tied to the student's login ID. Sage 50 executes as if it was installed on a single personal computer so the default configuration for file storage can be used. Since each student has a separate virtual machine no cross-contamination is possible. One negative aspect of this is that the instructor also has no access to the student's files if help is needed, but that access wasn't available when loaded on personal computers either. This is resolved when the student seeks help by having the student login in using their own ID in the instructor's office.

Another issue with projects such as those described in this paper is a failure of students to comprehend the purpose of the project in meeting the outcomes of the course. Project instructions need to include reference to the related course outcome with reinforcement by instructor comments when discussing project objectives. Students need to understand the purpose, otherwise it can be view merely as "busy work" by students who may successfully perform the mechanics of the project yet not gain the understanding intended. In addition, students need to complete an analysis at the end of the second project using specific criteria to compare the relevant characteristics of the two software packages. These are ongoing refinements of both projects.

## 6. Conclusion

Projects in the AIS course which use ERP and/or accounting general ledge applications are useful for preparing students for their future careers and for illustrating process and internal control concepts from the course. Careful planning however is necessary for those projects to successfully achieve course outcomes, to avoid confusing students, and to resolve issues before they occur. A review at the end of each semester also provides opportunities to learn from mistakes so future projects better achieve their purpose.

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