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The Evaluation of Application Controls in Accounting Software: A Short Instructional Case

Constance M. Lehmann
University of Houston–Clear Lake

Cynthia D. Heagy
University of Houston–Clear Lake

Carolyn Strand Norman
Virginia Commonwealth University

ABSTRACT: Internal control is a central topic in auditing and accounting information systems courses and is even more important since enactment of the Sarbanes-Oxley Act of 2002. The purpose of this case is to help students identify whether appropriate controls exist by attempting to execute unauthorized or improper transactions in a popular accounting software package. Students then compose a memo to summarize and explain the results of their transactions. This case helps students (1) identify application controls, (2) think about controls that may be weak, missing, or violated by an employee, and (3) consider and document potential risk exposures to an organization.

Keywords: internal control; application controls; risk assessment; risk exposure; case studies; accounting software.

Data Availability: Contact first author.

I. INTRODUCTION

Background Information

Recent corporate scandals, followed by the enactment of the Sarbanes-Oxley Act of 2002 (SOX), caused many interested parties—company management, stakeholders, auditors, professional organizations, legislators, and academics—to focus their attention on internal control. Management wants to ensure that the organization's activities are properly controlled so that company objectives are achieved. Stakeholders' (that is, shareholders, customers, suppliers, employees, creditors) want the organization to be effective and efficient to preclude the possibility of fraudulent financial reporting or business failure. Boards of directors, audit committees, and external auditors want organizations to have strong

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internal control to help mitigate the possibility of management wrongdoing and to give comfort that the annual financial statements accurately reflect the financial condition of the firm.

A number of professional organizations have conducted studies and issued reports regarding the nature and purpose of internal control, as well as guidelines to achieve effective internal control. The American Institute of Certified Public Accountants (AICPA) (1977, 1988, 1995, 2001) has adopted a number of Statements on Auditing Standards and the Public Company Accounting Oversight Board (PCAOB) (2004) issued Standard No. 2 to help guide external auditors as they examine an organization's internal control system. The Institute of Internal Auditors (IIA) (1991), Information Systems Audit and Control Association (ISACA) and Information Technology Governance Institute (ITGI) (2005) have published documents to assist internal auditors, Information Technology (IT) auditors, and IT management, as well as senior executives and directors in their IT governance responsibilities. These documents (e.g., the COSO and COBIT® frameworks) are widely accepted and used in all sorts of different types of organizations. Over the past several decades, legislators have passed a number of laws that focus on strengthening internal control for publicly traded companies. The most recent law is the Sarbanes-Oxley Act of 2002. Finally, accounting professors are responsible for teaching accounting students the importance of internal control and how to design, implement, test, and document internal control activities.

For this case, students use the Peachtree® Complete Accounting program to examine 15 possible transactions, execute seven of those transactions to observe how the software package handles the event, and finally, document their findings. For each of the seven transactions, each student must document: (1) which transaction was executed and how the program responded, (2) evidence of the response (appropriate screen shots), and (3) an appropriate conclusion regarding the possible impact of each control "weakness." The student then prepares a memo that rank-orders the transactions based on the potential impact to the firm if such a transaction was completed. This case may also be directly adopted as an add-on to the Internet based Quickbooks® Online project described in "Using a Web-Based Accounting System for Teaching Accounting System Design and Implementation" (Lin and Smith 2006).

Usefulness and Relevance of the Case

While we have used variations of this case in our individual Applied Information Systems (AIS) classes for the last ten years, we were interested in determining the case's usefulness and relevance. Consequently, we interviewed five IT auditors: one in public accounting (an IT Audit Senior Manager), two in private industry (an independent systems consultant and an IT Audit Assistant Director from a Fortune 500 company), one in academia (with many years of systems experience), and one in government (an IT Systems Auditor/Certified Computer Crime Investigator). The individuals were asked to review our case and comment on its usefulness in: (1) helping students understand the importance of application controls to minimize risk exposure, and (2) preparing students to evaluate application controls in computerized accounting systems. We also solicited suggestions for improvements to the case as well as feedback regarding the relevance of the case in the post-SOX environment. Responses were immediate and overwhelmingly positive. All five of the interviewees thought the case was relevant and helpful to accounting students. We incorporated their recommendations for improvement into the version used during the fall 2005 semester in all AIS courses at one university in the Southwest.

Learning Objectives of the Case

The learning objectives of this case are to help students understand (1) why accounting systems have internal controls, (2) that a control with manual override capabilities may not be a very effective control, and (3) the potential risk an organization might face if there are control weaknesses. The fourth learning objective is to help students practice their writing skills. Students must communicate their analysis in a memo to the IT Audit Supervisor (the professor). This objective is in response to a number of studies over the past decade that indicate accounting majors need good writing skills, which are necessary in the profession (e.g., Stocks et al. 1992; Baird et al. 1998; and Riordan et al. 2000).

Controls in Automated Systems

Testing automated systems and application controls is part of the process of determining the effectiveness and completeness of the internal control structure of an organization (COBIT 2005; PCAOB 2004; SOX 2002; COSO 1992). The case provides an illustration of some of the problems that may occur during tests of application controls. Automated preventive controls are the strongest type of controls. If they are not present, manual detective controls must be incorporated into the data-entry or review processes to minimize improper accounting transactions. Of course, the absence of these vital controls increases the business risk (and potential losses) of the organization.

This case helps students assess risk exposure for the company and then determine the possible implications of that risk. Current accounting graduates, regardless of the career paths they may pursue, must understand and must practice the types of activities associated with financial and operational audits. According to the experts we interviewed, developing risk assessment skills is a critical endeavor for all management accountants, internal auditors, external auditors, IT auditors, and governmental accountants. For instance, significant operational risks can arise when more items are sold than are available in inventory. In addition to having angry customers, negative amounts of inventory can cause problems with inventory control and planning. As another example, if a company employee has the ability to extend credit to a customer (i.e., exceeding credit limits without proper authorization), this can create cash flow and collection problems, increasing the possibility that the company might not be financially successful in the long run.

Student Feedback

Student feedback to this case has been overwhelmingly positive. In fact, this is typically cited on end-of-course evaluations as the most interesting and valuable project in the course. Since the addition of the reflective memo, students indicate that this writing requirement is particularly helpful because it focuses on the importance of internal controls. Students also become aware of the serious nature of: (1) no controls, or (2) in-place controls that are "weak," i.e., employees can override the control. In fact, one student thought all of the controls he examined were working just fine until his instructor pointed out that, although an error message appeared for each of the transactions he examined, he could still click "OK" or "YES" to continue the transaction without any supervisory approval. In effect, he could manually override the warning (the embedded control in the software program) and continue the improper or unauthorized transaction. The student then realized that even though his transactions generated error messages, the controls in Peachtree were "weak"



in that he could continue to process these transactions without anyone's approval (e.g., a supervisor).¹

We administered a survey (see Appendix) to the students, after the fall 2005 semester, and asked for their degree of agreement/disagreement with statements such as, "This case enhanced my understanding of the importance of segregation of duties in processing accounting transactions" (where 1 = "Strongly Disagree" and 7 = "Strongly Agree"). The results of that survey are included in Table 1, Panel A. For all of the statements, the average response was between "5" (Slightly Agree) and "6" (Agree). The statement that received

TABLE 1
Results of Post-Case Survey

Panel A: Results of Post-Case Survey^a

<u>Case enhanced my understanding/ demonstrated importance of:</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u># of Students Responding "6" or "7" (of 23 total responses)^b</u>
Internal controls	6.0	1.1	18
Segregation of duties	5.8	1.2	15
Input controls	6.0	1.1	17
Access security	5.9	1.2	17
Review of input logs	5.5	1.3	12
Review of exception reports	5.7	1.1	14
Processing controls	5.7	1.2	16
Audit program to perform audit tasks	5.7	1.3	17
Risk exposures	5.7	1.3	17

Panel B: Results of Exam Questions

<u>Number of Students = 24</u>	<u>Number of Students Answering Correctly</u>	<u>Average</u>	<u>Std. Dev.</u>
Definition of internal control	20	83.33%	0.38
Internal control basic documents (e.g., COSO)	22	91.67%	0.28
User authentication definition	10	41.67%	0.50
Application controls (as opposed to general controls)	22	91.67%	0.28
Risk assessment requirements	9	37.50%	0.49
Proper segregation of duties	22	91.67%	0.28

^a Responses were on a seven-point Likert scale (1 = Strongly Disagree, 2 = Disagree, 3 = Slightly Disagree, 4 = Neither Agree/Disagree, 5 = Slightly Agree, 6 = Agree, 7 = Strongly Agree) indicating agreement or disagreement with the statements listed.

^b One student was not in class the day the survey was distributed.

¹ Our thanks to an anonymous reviewer who pointed out that an "override" of a control is not necessarily an adverse event. For example, the customer credit-check control is a review of a customer's credit limit, which compares this total to the customer order to determine if a credit limit would be exceeded. If the clerk is well trained and honest (two general controls), the control works quite well. If the owner of a small business needed to execute an override every time a clerk had an exception, the owner might not get anything else accomplished. Accordingly, the owner might choose to shut off some control features. In this case, the override feature can provide flexibility. On the other hand, using our credit limit example, the small business owner might wish to examine these customer accounts more carefully to determine if the credit limit of some customers can be increased without exposing the company to unusual risk. In so doing, the existing control could be maintained and the override would not be necessary.

the lowest mean response was, "this case demonstrated the importance of regular review of input logs" (mean response = 5.5). We suspect this might be the case because we emphasize the importance of input log reviews as a control activity, but we do not require students to review these logs as part of the case. Based on this student feedback, we intend to emphasize this activity in future classes so that students have a better understanding of the value of these logs and realize they should be incorporated into application controls in a real company.

We also tabulated student performance on multiple-choice questions on the exam covering internal control (among other things) that was administered after this case was completed. The means and standard deviations for the twenty-four students in the class are reported in Panel B of Table 1. Twenty-two of the 24 students answered questions in the following areas correctly: internal control documents, application controls, and segregation of duties. Twenty of the students answered the question related to the definition of internal control correctly. The question related to risk assessment gave students the most trouble (only nine of the students answered correctly). Apparently, students did not realize that identifying and ranking the risk exposures in their written reports was, in effect, assessing risk. In the future, our discussion of the case should include a discussion of the link between risk exposures and assessment of risk for a company.

II. THE CASE

In the absence of internal controls, or in the presence of inadequate controls, an organization is very vulnerable to losses (e.g., misappropriation of assets, materially misstated financial statements). This case demonstrates how adequate controls can help prevent such losses. In addition to the internal control lesson (and thinking about the implications of weak controls), this project is also a review of typical transactions recorded in an accounting software application.

Exhibit 1 presents a memo with background information, and Exhibit 2 includes a list of fifteen potential transactions. Choose any seven of these transactions (or one that you might think of) and enter the transaction in Peachtree. Observe the results of your transaction. That is, did you receive a warning? Were you allowed to complete the transaction? Was an appropriate application control in place and did it work as you would have expected?

Once you complete each transaction, document your results as requested in Exhibit 1, and submit the memo to your IT Audit Supervisor (i.e., your professor). Identify the transaction tested (using the audit program as a guide), the findings (including screen shots), and rank-order the seriousness of each result obtained. Your memo should discuss the potential business risk to the organization, based on the results you obtained from entering (or attempting to enter) the improper or unauthorized transaction. In other words, the first transaction listed in the memo should be the most serious risk exposure to the organization, and the last one should be the least serious.

As you draft your memo, please keep your audience in mind. Although the memo is addressed to your IT Audit Supervisor, you must also present your results to the management of the company and the IT Steering Committee. Remember that the intent of these tests that you are conducting is to advise the company regarding purchase of a software package. Your conclusions and analysis of each transaction should reflect this purpose.

III. CONCLUSION AND ANALYSIS

Allowing sales to unauthorized customers could increase the risk of uncollectible accounts receivable. The lack of this control can also allow for sales to fictitious customers

EXHIBIT 1
Student Instructions for Case

Earlen Industries, Inc.

To: _____ (Student's name)
From: _____ (Instructor's Name), IT Audit Supervisor
Re: Accounting System Controls Assessment

Earlen Industries might purchase the Peachtree Complete Accounting program. Your task is to examine a number of possible transactions for this accounting software program to determine the results. The management and IT Steering Committee asked for a presentation of your findings. The company has experienced problems and losses with the current AIS due to insufficient application controls and does not want to repeat the experience.

Examples of transactions that you might examine are listed on the next page. You might think of other transactions in addition to these 15, which is fine. For each transaction that you examine, you may use the database from the company that you created or one from the sample companies included in Peachtree. The detailed specifications are in the attached Audit Program and Sign-Off Form (Exhibit 3). You need one copy for each transaction (i.e., seven). Please date and initial off each step as it is completed. (Please do this in ink).

Note that the Audit Program and Sign-Off Form requires you to perform the following steps for each control you test:

1. Identify the transaction you selected.
2. Describe the result obtained.
3. Document your results.
4. Document your conclusion and analysis of the results.

Prepare appropriate documentation for each control you examine similar to the sample in Exhibit 4. Be sure you clearly label each step. You will have one Audit Program and Sign-Off Form and one control document for each transaction you examine. After you complete these requirements, discuss in a memo addressed to your IT Audit Supervisor the control weaknesses you found, and which are the most serious (rank-order these starting with the most serious). Be sure to fully support your conclusions. For example, think about the possible frequency of occurrence and the potential problems associated with each occurrence. Submit the memo, the seven Audit Program and Sign-Off Forms, and your documentation to me.

Thank you for your help. If you have questions, please email or call my office.

(embezzlement) and might lead to misstated financial statements (might report fraudulent revenue). Since sales are posted daily, the frequency of the potential problem is significant. I recommend that any changes to the customer master file be properly authorized by a supervisor and that guidelines be established for proper addition of new customers. For example, appropriate segregation of duties would require the account be established by the sales department personnel and the credit limit be established by the credit department personnel.

EXHIBIT 2

Potential Transactions to Enter in Peachtree

DIRECTIONS: You may select any seven of the following 15 transactions (a–o, or one of your choosing), and must then enter the transaction in Peachtree to observe the result.

- a. Make a sale to a customer that exceeds that customer's credit limit.
- b. Make a purchase from a vendor that exceeds the established purchase limit.
- c. Enter a customer code that does not exist when making a sale.
- d. Record a return that exceeds the original sale.
- e. Pay a vendor an amount that is higher than the accounts payable due the vendor.
- f. Receive from a customer an amount that is higher than the accounts receivable due from the customer.
- g. Sell more units of inventory than you have on hand.
- h. Return more units of inventory than you purchased.
- i. Make purchase returns to a different vendor from the one you purchased the units from.
- j. Purchase a quantity of inventory that exceeds the economic order quantity.
- k. Print the same check more than one time.
- l. Process a transaction that does not balance.
- m. Change the contents of the primary key field for a master file account.
- n. Change the account balance of a general ledger account by changing the amount in the field of the record in the general ledger master file.
- o. Delete an account in the general ledger master file that has a balance in it.
- p. Other controls that you might think of: _____

Instructions for Printing a Screen

- 1. Before the screen which contains the error message appears, open a Word file.
 - 2. Minimize the Word file.
 - 3. After the error message screen appears, press the "Alt" and "Print Screen/SysRq" keys at the same time.
 - 4. Maximize the Word file.
 - 5. Use the "Paste" icon on the toolbar of the Word file. A copy of the screen will appear on the Word document. Save file as "Peachtree error codes."
-

EXHIBIT 3
Audit Program and Sign-Off Form

ACCOUNTING SYSTEM	AUDIT NO.	COMPANY/LOC.	PAGE
TRANSACTION ASSESSMENT	PEACHTREE	EARLEN INDUSTRIES	1

No. AUDIT PROGRAM DESCRIPTION

Area of Review

INITIALS DATE

- 1 **Description of Transaction/Control:**
Identify the transaction that you selected. Prepare a short description of what sort of application control would prevent the transaction from processing, what it would do, and why.
- 2 **Description of the Result Obtained:**
Prepare a short description of the result you obtained from entering the transaction. That is, did you receive a warning? Were you allowed to complete the transaction? Was an appropriate application control in place and did it work as you would expect?
- 3 **Documentation of Result:**
Document your results. For example, if you enter an invalid customer code and the program displays an error message such as "customer does not exist," print the screen. (See the instructions for printing a screen in Exhibit 2.) Documentation for a test of whether the program lets you return more units of inventory than you purchased could be a printout of the original purchase order and a printout of the purchases return report. Include descriptions on the printouts so the reader can easily follow your documentation.
- 4 **Conclusion and Analysis:**
Document your conclusion and analysis of results. Was a control weakness observed? If so, how serious is the control weakness and why. Think about the frequency of occurrence and the potential problems associated with each occurrence and include that in your discussion.

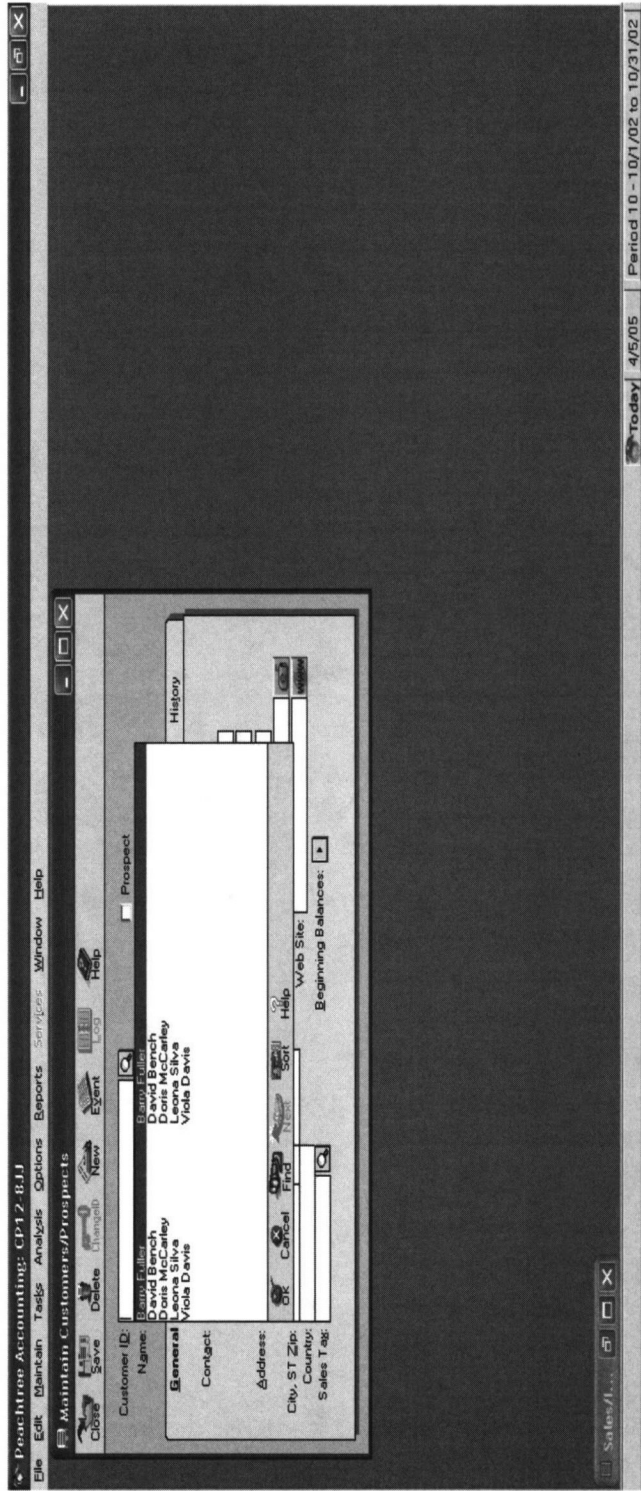


EXHIBIT 4
Sample Documentation

Description of Transaction/Control: Peachtree should block sales to customers not entered in the Customer Master File (i.e., prohibit insertion anomalies). Only sales to customers listed in the Customer file should be permitted.

Description of Result Obtained: I attempted to enter a customer, Miles, not listed in the Customer Master file in the Sales/Invoicing Task screen. Peachtree allowed me to enter the transaction, but would not allow me to save it. I appropriately received an error message. The application control worked.

Documentation of Result: Screen shot of Customer Master File showing that Miles is not a valid customer.

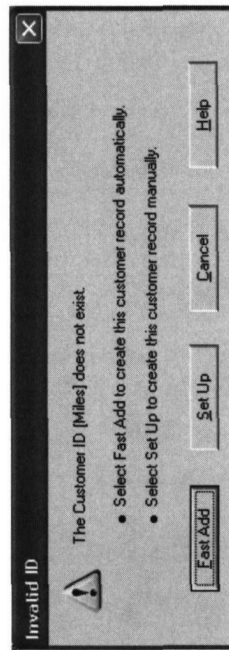


(continued on next page)



EXHIBIT 4 (continued)

Error message screen I received when I tried to save the transaction:



**APPENDIX
POST-CASE SURVEY STATEMENTS**

	<u>Strongly Disagree</u>	<u>Disagree</u>	<u>Slightly Disagree</u>	<u>Neither Agree or Disagree</u>	<u>Slightly Agree</u>	<u>Agree</u>	<u>Strongly Agree</u>
1. This assignment improved my overall understanding of the importance of internal controls in accounting applications.	1	2	3	4	5	6	7
2. This assignment enhanced my understanding of the importance of segregation of duties in processing accounting transactions.	1	2	3	4	5	6	7
3. This assignment enhanced my understanding of the importance of input controls (e.g., authorization codes and /or signatures).	1	2	3	4	5	6	7
4. This assignment enhanced my understanding of the importance of access security (e.g., the need to set up access rights for system users).	1	2	3	4	5	6	7
5. This assignment demonstrated to me the importance of regular reviews of input logs (e.g., master file maintenance controls).	1	2	3	4	5	6	7
6. This assignment demonstrated to me the importance of reviewing exception reports (e.g., report generated in response to sale of more inventory than available in stock).	1	2	3	4	5	6	7
7. This assignment demonstrated to me the importance of maintaining proper processing controls (e.g., pre-numbered documents, visual checking of information).	1	2	3	4	5	6	7
8. I feel that structuring this assignment around the "Accounting System Controls Assessment" audit program form will help prepare me to perform audit tasks as a professional auditor.	1	2	3	4	5	6	7
9. The reflective memo improved my understanding of the risk exposures resulting from weak internal controls.	1	2	3	4	5	6	7



TEACHING NOTES

Teaching Notes are available only to full-member subscribers to the Journal of Information Systems through the American Accounting Association's electronic publications system at <http://www.atypoint.com/action/showPublisherJournals?code=AAA>. Full member subscribers should use their personalized usernames and passwords for entry into the system where the Teaching Notes can be reviewed and printed.

If you are a full member of AAA with a subscription to the Journal of Information Systems and have any trouble accessing this material, please contact the AAA headquarters office at office@aaahq.org or (941) 921-7747.

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