Communications of the Association for Information Systems

Volume 36 Article 30

5-2015

Accounting Information Systems (AIS) Course Design: Current Practices and Future Trajectories

Pam Neely
The College at Brockport, SUNY, pneely@brockport.edu

Nicole Forsgren
Utah State University

Ron Premuroso
University of Montana

Chelley Vician
Opus College of Business, University of St. Thomas

Clinton E. White
University of Delaware

Recommended Citation
Neely, Pam; Forsgren, Nicole; Premuroso, Ron; Vician, Chelley; and White, Clinton E. (2015) "Accounting Information Systems (AIS) Course Design: Current Practices and Future Trajectories," *Communications of the Association for Information Systems*: Vol. 36 , Article 30.
DOI: 10.17705/1CAIS.03630
Available at: https://aisel.aisnet.org/cais/vol36/iss1/30

Communications of the Association for Information Systems

CAIS

Accounting Information Systems (AIS) Course Design: Current Practices and Future Trajectories

Pam Neely

College of Brockport, State University of New York

pneely at brockport.edu

Nicole Forsgren

Utah State University

Ron Premuroso

University of Montana

Chelley Vician

Opus College of Business, University of St. Thomas

Clinton E. White

University of Delaware

Abstract:

The accounting information systems (AIS) course is a core component of most accounting programs, but what it typically covers and how it's typically taught is as varied as the number of instructors. As the AACSB Standard A7 indicates: "accounting degree programs include learning experiences that develop skills and knowledge related to the integration of information technology in accounting and business". In this panel presentation, we looked at the approach of five experienced AIS instructors and compared and contrasted them. We highlight lessons learned and best practices.

Keywords: Curriculum, Accounting Information Systems, Information Systems, CPA.

Volume 36, Article 30, pp. 599-617, May 2015

The manuscript was received 02/07/2014 and was with the authors 5 months for 1 revision.

I. INTRODUCTION

The accounting information systems (AIS) course is a key part of the undergraduate degree program preparation for professional accountants and certification as public accountants (AICPA, 2014). Additionally, many master of accountancy programs offer advanced topics in accounting information systems coursework. Information systems (IS) educators bring interdisciplinary strengths to how these courses can be developed, executed, assessed, and adjusted for the accounting profession's future.

There is some debate over what the content, structure, and proposed conduct of this course should be among accounting educators and practitioners (Bain, Blankley, & Smith, 2002; Murthy & Ragland, 2009; Vasarhelyi, 2012), and this discussion is extended when information systems educators and practitioners are included (Dillon & Kruck, 2008). Some educators advocate a "skills orientation" that focuses on the use of actual software used by professional accountants (such as QuickBooks or auditing-focused tools such as Accounting Control Language or IDEA) and/or intermediate level skills applying Microsoft Excel and Access tools. Others call for more project-based work that emulates real-world engagement management in public accounting and small-business situations. Others still emphasize control and governance concepts and/or advanced technology experiences such as Extensible Business Reporting Language (XBRL), SAP, and business intelligence/data analytics. As the old joke goes, if you get five AIS educators together, they will teach the course six different ways. As such, many different examples of course designs exist for the AIS course and result in differing academic preparation for newly graduated accounting professionals.

This paper reports on a panel at the Americas Conference on Information Systems in 2012 that examined these design differences. This paper provides a progress report on AIS course designs in both undergraduate and graduate degree programs, and guides educators tasked with developing such courses in the future. We direct the paper toward faculty members responsible for AIS courses in curricular efforts and those who may become responsible for such efforts in the future. The panelists provided highlights from a broad survey of current AIS course practices and four examples of course designs based on their individual experiences. Panel and session participants discussed these experiences, the implications of differing academic preparation on accounting practice, and ideas for future course designs.

II. PANEL'S ORGANIZATION

Chelley Vician organized and moderated the panel. The panelists were experienced faculty who are active in AIS course design. and AIS curricula at their institutions and in the academy. The panel opened with an overview presentation of AIS course design (based on excerpted results from a survey of current AIS instructors) and proceeded with each panelist sharing details of their AIS course design(s). The presentations were, in order of appearance: Ron Premuroso from the University of Montana (whose slides were presented by Chelley Vician because a remote connection could not be sustained), Clinton E. "Skip" White from the University of Delaware (whose slides were presented by Chelley Vician due to a last-minute emergency), Pam Neely from the College at Brockport–State University of New York, Nicole Forsgren from the Huntsman School of Business at Utah State University, and Chelley Vician from the Opus College of Business at the University of St. Thomas–Minnesota. Some of the areas the panel explored included:

- Current practice in AIS course design: curriculum positioning, pedagogy (textbook, software, topics, assignments), and use of teamwork
- Curriculum design for two undergraduate (i.e., introductory and advanced) AIS courses
- Online vs. face-to-face applied projects for introductory AIS courses
- Building information systems projects in introductory AIS courses
- AIS course design for master of accountancy programs

III. AIS COURSE DESIGNS: CURRENT PRACTICE AND FOUR EXAMPLES

Ronald Premuroso, University of Montana–Excerpted Educator Survey: Current Practice

Ron's presentation reported on selected results of a survey of U.S. AIS educators (Herron & Premuroso, 2012). The survey was designed using Survey Monkey. In March 2012 a link to the survey was sent by email to 825 AIS

educators whose names and email addresses were obtained from the 2011-2012 Hasselback Accounting Directory. Twenty-five (25) email requests were undeliverable to the intended recipients, resulting in a sample size of 800. Recipients were requested to forward the survey to other AIS instructors if the Hasselback listing was incorrect. A reminder email request was sent in April 2012 and approximately 160 usable responses were received—a 20 percent response rate. In this paper, we provide basic preliminary statistics for the survey results organized by several categories. More details on these excerpted survey results are available by directly contacting Herron and Premuroso.

The AIS Course in Situ—Program? Timing? Required? Advanced Option?

The first set of survey questions asked 1) how the introductory AIS course was positioned in undergraduate curriculum, 2) which program the course was placed in, 3) the timing of the course scheduling, and 4) additional AIS courses offered and/or required.

For questions one and two, respondents indicated that the overwhelming majority of AIS courses (95%) were taught in the accounting or accounting/IS program. As such, it seems that most curricula perceive the course as an accounting, not an IS, course. For question three, almost 70 percent of the respondents required students to take the course some time during the third year of a bachelor's degree program. Another 17 percent had students take it during the fourth year of a bachelor's degree program. As such, the majority of programs put this class after the introductory and intermediate accounting courses, most likely to ensure that the course can focus on systems topics that build on technical accounting knowledge covered in prior accounting coursework. The AIS course is also seen as priority for accounting degree programs because over 92 percent of survey respondents require the course of their accounting majors.

Interestingly, although the first AIS course has clear value, few programs included an advanced AIS course (17%), whereas 83% of respondents stated that they did not offer both an introductory and advanced AIS course at the undergraduate level. Of the 29 schools that offered an advanced AIS course, only one third of them (10 schools) required the course to be taken by their accounting majors. The remainder offered the advanced AIS course as an elective.

In summary, the majority of schools required accounting major students to take an introductory AIS course in their accounting program in either the third or fourth year in bachelor's degree program. A very small percentage of schools offered an advanced AIS course, and the majority that did offered it as an elective.

The AIS Course Pedagogy—Textbooks? Software? Topics? Assignments?

As Figure 1 shows, a little over 40 percent of instructors responding to the survey used the Romney and Steinbart (2012) AIS textbook as their AIS primary text. Another 25 percent either created their own materials for the class and/or did not use any type of textbook. The remainder of the respondents chose among several other competing textbooks (see Appendix A for a listing of textbooks reported in our AMCIS presentation).

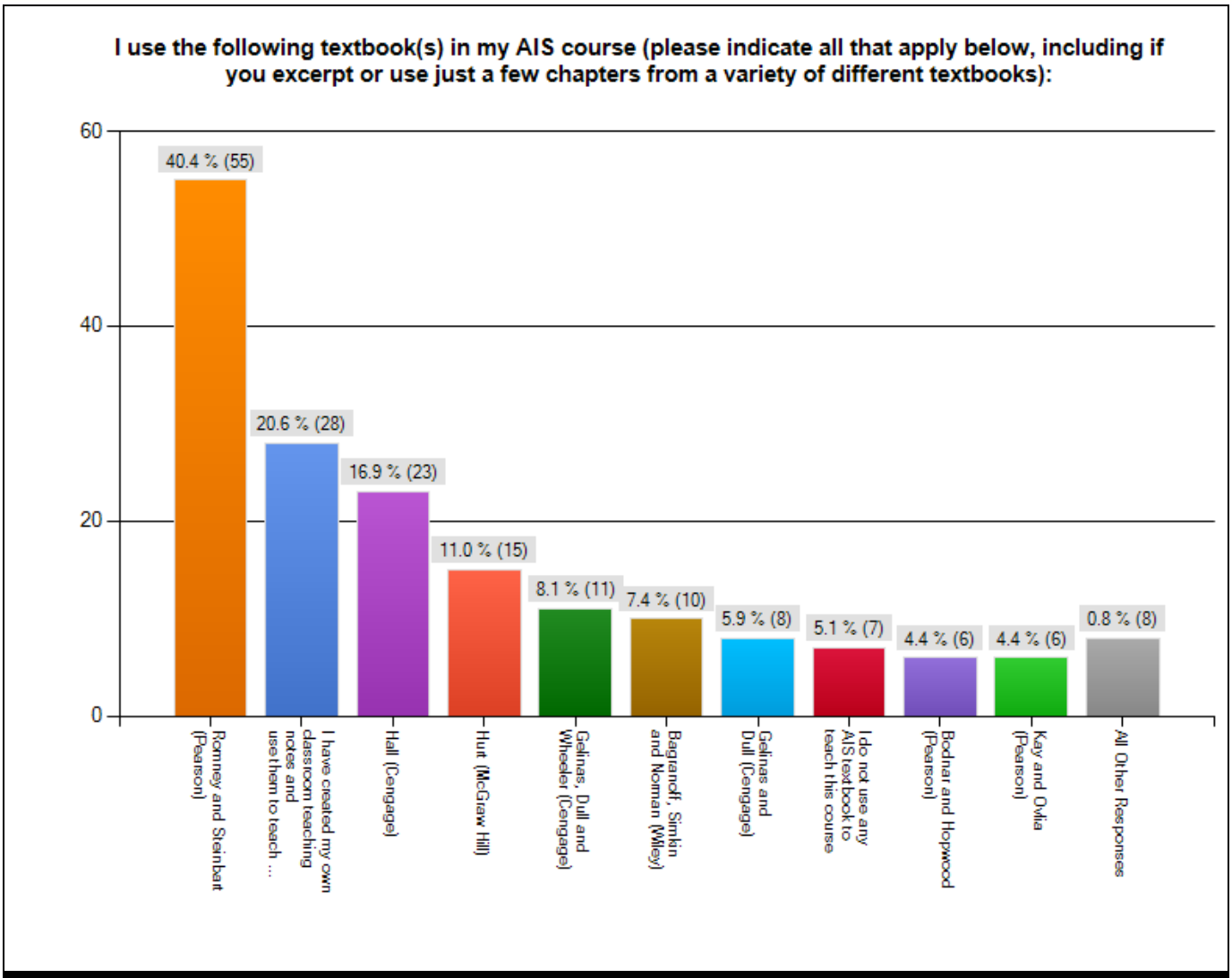

Figure 1. AIS Textbook Choice (Herron & Premuroso, 2012)

Figure 2 illustrates the true complexity of designing the AIS course because it highlights the diversity in topic coverage among survey respondents. The single largest component of the chart is "all other topics" (42%). Given that multiple topics are covered in a course, the percentages of each slice indicate the percentage of respondents that covered each topic as calculated from the 150 respondents to this survey question. As the figure shows, those topics with a relevant pie slice are covered by 70-98 percent of the respondents. Major topics covered were internal controls, system documentation techniques, introduction to systems, COSO, introduction to transaction processing, transaction processing—revenue, transaction processing—expenditures, Sarbanes-Oxley (SOX), IT general controls, and database management systems. These topics represent where the pedagogy of accounting and information systems curriculum meet and tend to yield more to the IS side of the equation[1].

[1] Each respondent was given a list of topics to pick from that they taught at the time of the survey in their introductory AIS course. Therefore, some AIS instructors who answered the question could have been teaching most, some, or very few of the topics. The percentages shown on the chart show the percentage of those instructors covering that topic in their introductory AIS course. Therefore, for example, 97.9% of the instructors answering this question included internal controls as a topic they taught in the introductory AIS course (150 instructors answered this particular survey question, and 139 of them include internal controls in their teaching of the introductory AIS course). The big category, other (42%), included topics taught in the introductory AIS course not listed or shown in the pie chart. A list of those "other" topics, which the respondents wrote in, can be provided by contacting Herron and Premuroso.

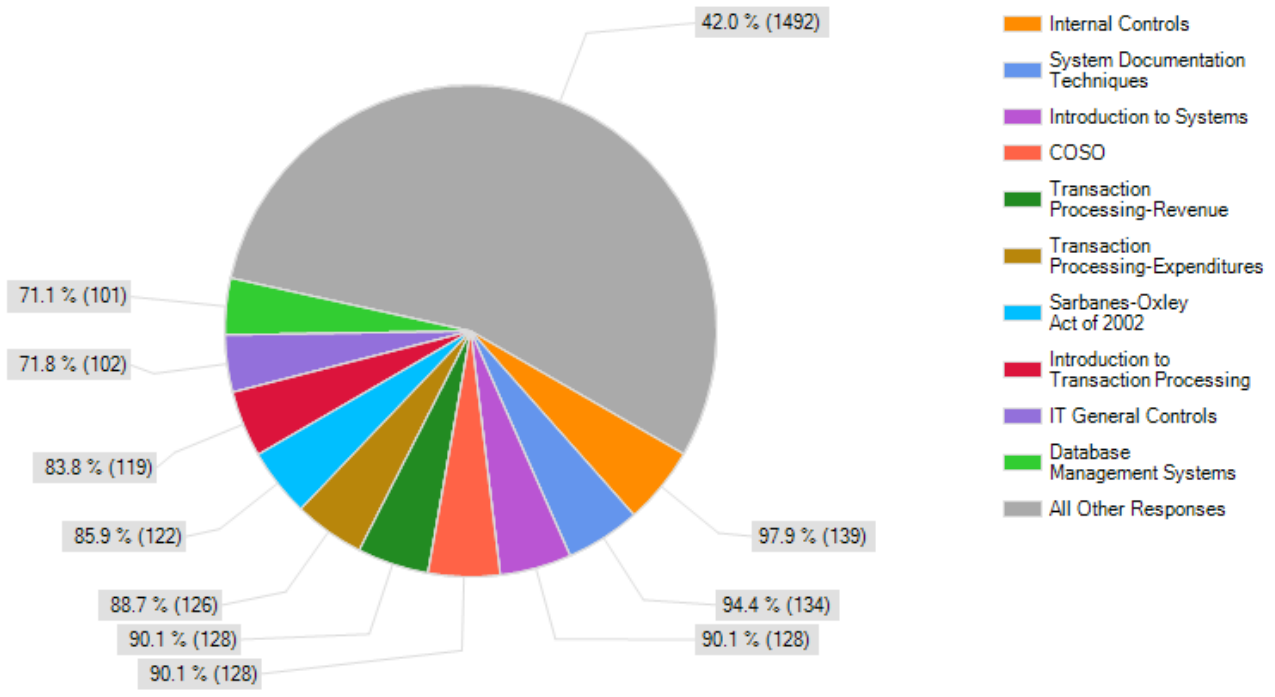

Figure 2. AIS Topic Coverage (Herron & Premuroso, 2012)

A manual accounting project using special journals and source documents is an effective way to illustrate the transaction processing cycle. It reinforces the fact that source documents, not paragraphs in books, actually drive accounting transactions and that the transaction flows through the accounting cycle and culminate in a post-closing trial balance. The *Systems Understanding Aid* (SUA), developed and marketed by Arens and Ward (2012), which comprises journals, ledgers, source documents, and flow charting exercises, was used in 35 percent of the respondents' courses. The report explicitly refers to the SUA because it was the most common practice set (based on anecdotal evidence) used at the time of our survey in AIS classes. Respondents could list other practice sets used. Another 15 percent used some other type of practice set. Almost 50 percent did not use a manual practice set at all. Given the time constraints of the course and the time intensity of the practice set, the cost of the practice set may be too high for many AIS classes.

The results show that the majority of AIS courses included some type of software coverage, with Access and Excel (62% and 60%, respectively) the most prevalent. With respect to general ledger (GL) accounting software, SAP had the most coverage (17%). Although none of the small business GL packages such as Peachtree or QuickBooks are represented, they may fall in the 23 percent of other responses reported in Herron and Premuroso's study.

Extensible Business Reporting Language (XBRL) uses tags to convert financial statements into a machine-readable form for easier (and less error-prone) transmission of financial information. Almost half of the survey respondents covered XBRL and used one class session to cover this topic. Another 40 percent did not introduce the XBRL topic at all in their AIS classes.

Systems documentation continues to be a vital part of most AIS courses: 61 percent of the respondents used both data flow diagrams and system flowcharting. As systems documentation is a necessary tool to prepare adequately for an audit under both SOX and generally accepted auditing standards, the AIS course, as a natural place for this

Communications of the Association for Information Systems

content, relieves some of the burden on the auditing course with regards to covering these system documentation topics.

Similar to system documentation, almost 49 percent of the respondents taught the resources, events, and agents (REA) modeling approach in their introductory AIS course. Interestingly, almost 14 percent replied that they used to teach REA in the AIS course, but no longer do so. This may be a reaction to the increasing pressure to add additional topics into the course, such as General Ledger software coverage or the *Systems Understanding Aid*.

In summary, the AIS course seems to be very eclectic, with topical coverage and content covered by instructors answering our survey all over the board. While many have retained the historical perspective that resides in the IS arena of systems documentation and database development, many seem to be heading in the direction of "accounting as a system" and helping students to understand how the system can support a business's processes and management's decision making. The choice of a textbook that covers everything in any given course continues to be a challenge.

The AIS Course Design—Teamwork for Business Projects?

The final set of questions focused on group work in the AIS classroom. It is evident that business people work together in teams, particularly in auditing. Given this skill development requirement, have AIS educators been incorporating group work into the course and the classroom?

Almost 61 percent of the respondents did include group work as part of the course requirements. Of this number, 70 percent used it in software projects; in turn, of that number, 35 percent used case studies. The group projects carried a minimal amount of the total course grade weight (between 10% and 25%) for 43 percent of the respondents. Thus, although group work was required, most students were apparently not unduly penalized by "slacker" team members.

To summarize, there is a wide degree of subject/software/textbook coverage that differs by institution. Assuming that professors gear their AIS course toward the type of student audience or employer served (e.g., big four CPA, smaller CPA, corporate, government, etc.), we can expect this diversity in coverage. Further, given employer requests for differing entry-level skills and knowledge, local marketplace demands continue to influence instructional emphasis of software, case studies, and experiential cases.

There is a natural evolution toward contemporary topics (XBRL, ERP, Outsourcing, SAP, Oracle, SOX, Foreign Corrupt Practices Act), yet there was still a focus on system documentation, the ability to teach and help students understand transaction cycles, and the financial statement effects of control weaknesses. Armed with this data, we now describe AIS courses at four universities.

Clinton E. "Skip" White, University of Delaware: Two Undergraduate AIS Courses

Skip White provided an example of designing a two-course sequence in AIS topics when there is room for more than one course in the curriculum.

Curriculum Background: The Program and Stakeholders

The University of Delaware's Lerner College of Business and Economics has a combined accounting and MIS department. All students in this college are required to take two MIS classes: the introductory "Business Computing: Tools and Concepts" course, which focuses on computing concepts and desktop tools such as Excel, PowerPoint, Word, and Access. Following that, all business majors take the "Business Information Systems" class, with a heavy focus on Access and relational databases. All MIS majors and minors take the "Introduction to Programming Business Applications" class, which focuses on Java, and accounting majors take the "Accounting Information Systems" class, which focuses on relational databases and Access.

In the MIS program, there are MIS majors who are referred to as "business systems developers", MIS minors who are referred to as "business analysts", and global enterprise technology minors who focus on large-scale systems and issues in global enterprises. Although this panel's focus was on AIS, the MIS function directly supports accounting students' aim; that is, to develop systems that can be used for management decision making. In particular, MIS minors develop skills that are used by all accountants.

Course Design Elements: The First (Introductory) AIS Class

The first AIS class, titled "Accounting Information Systems", focused on REA, the resources, events, and agents ontology of accounting information systems (McCarthy 1982). REA focuses on modeling accounting information systems from the perspective of the basic elements present in all accounting and business relationships (i.e.,

resources: inventory, cash, etc.; events: sale, purchase, commitment, etc.; and agents: internal and external parties involved in business events with the business entity). Using the REA ontology, students are taught how to model data and relationships to create relational databases to solve business problems and support the standard accounting transaction cycles (e.g., purchase to payment and sales to collection). Students complete a final project in which they implement a full transaction cycle by using Microsoft Access as a development tool. This first AIS class is offered during a student's third year and the text used is *Resources-Events-Agents: An Ontology for Designing, Controlling and Using Integrated Enterprise Systems* (Dunn, 2012).

Course Design Elements: The Second (Advanced) AIS Class

The second AIS class, titled "Strategic IS and Accounting", was developed several years ago to focus on current IS topics relevant to accounting. Topics in the class at the time of writing include:

- IT's role in accounting and IT's value
- Cloud computing
- Social media trends
- Data privacy and security
- IT implementation success and failure
- XBRL (5 weeks)
- SEC filings
- ERP in business and accounting
- Web services
- Sarbanes Oxley and IT controls

Students complete several hands-on projects in which they learn to build XBRL instance documents, analyze them, and access and assess corporate filings in the SEC EDGAR database. This is a fourth year course and an elective for MIS majors.

Curriculum Lessons Learned

About 50 percent of the accounting majors are also MIS minors. The MIS minor has been the flagship program in the college since the mid-1980s. Students take "Introduction to Business Programming" (Java), "Databases" (MySQL and SQL), and "Systems Analysis and Design" in addition to the AIS course. The capstone course (MISY 431 & 432—6 credits in the Spring semester) involves working in teams to address and solve a real business problem for a client. Projects involve things such as:

- Proposing a bring-your-own-device (BYOD) strategy for a company with a large mobile workforce.
- Implementing a transition strategy from Access to MySQL.
- Analyzing software alternatives and proposing a solution for a specific business problem.

Clearly, the University of Delaware approach is working since over 95 percent of the students who are accounting majors and MIS minors have been hired at premium salaries.

Pam Neely, College at Brockport–State University of New York: Online vs. Face-to-Face

Pam presented the results of teaching two sections of the introductory, required AIS course, one online and the other face-to-face (F2F). These courses were taught in the Spring 2012 semester.

Course Background: The Program and Stakeholders

As indicated earlier, the topics covered in any given AIS course should be influenced by the needs of the program's stakeholders—a key stakeholder being employers of the institution's graduates. Approximately 50 percent of the students in the accounting program at Brockport end up taking corporate or government jobs and only about 2-3 percent go to work for the largest public accounting firms (e.g., the big four firms: PwC, E&Y, Deloitte, KPMG). The remaining students are recruited for large regional public accounting firms. The college's accounting advisory board, which comprises corporate and public accounting members, felt strongly that QuickBooks should be a part of the curriculum. Given the number of students who are employed by companies (instead of public accounting firms), it was also vital to include a significant Excel component. These considerations drive the curriculum and pedagogy of the AIS course at the College at Brockport—SUNY.

Two sections of the course were taught during the Spring 2012 semester, one online and the other F2F. Both classes had the same course structure: 4 group projects, online quizzes and exams, a discussion board, and weekly

project deliverables due at midnight on Sunday. The primary difference between the two classes was that the F2F class had three mandatory scheduled lab hours per week and the online class had an optional two-hour lab.

Course Design Elements: Topics and Rationale

Four projects were assigned to both classes. The first project was a manual practice set, developed by the professor and implemented in Excel. Students were expected to have a functional knowledge of Excel on entering the course. However, the most complex Excel concept in the project was an ability to navigate multiple worksheets in a workbook. Navigation hyperlinks were added to the worksheets to allow the students to easily move between the various journals and subsidiary ledgers, external source documents, and documents to be filled out. Students were encouraged, but not required, to add formulas of their own to easily move data through the transaction processing cycle. This project provided the students with a "look under the hood" at what general ledger software packages provide. Additionally, this course was taken during a student's second year of a bachelor's degree program and many students were not yet as familiar with the basic accounting concepts as they should have been. This project allowed them to see the accounting cycle from start to finish and reinforce the reasoning behind specific journal entries. Students have reported learning more accounting from this project than from their first two accounting classes in total.

The second project used QuickBooks and had the students setting up a company, running transactions, and answering business questions with the reporting features. Students were asked to consider the ramifications of creating an invoice or check by tracing the transaction through the system so that they could understand how the manual project and GL project are related.

The third project used the knowledge gained from the first two projects. Students use Peachtree (now Sage 50) to setup and implement the transactions from the manual project. They were asked to gather the data (i.e., customer information, company information, employee information, etc.), set up the company, run the transactions, and answer business questions using the reporting feature. They analyzed the transactions in the first project and learned how a GL package works in the second project. They also knew what the output should be because the manual project had previously been graded and handed back to them. The goal of the project was to help them understand that all GL packages perform the same function and that they simply differ in interface.

The final project comprised four Excel cases involving new functionality such as scenario manager, goal seek, range names, and advanced functions. These projects were not directly related to the first three projects and were given at the end of the semester, when work in their other classes is ramping up. The majority of students spent about one-third of the time on these cases that they spent on the earlier projects.

All projects had weekly deliverables to ensure that students stayed on task. Grading included feedback to point out errors before they moved on to subsequent portions of the project. Students were given an opportunity to correct the errors and receive further feedback if desired. Ultimately, if students responded to feedback with corrections, their final project grades were very high.

Course Design Elements: Approaches and Assessment: Group Work

Groups were assigned randomly and both classes had groups of four. The online class groups met virtually using tools such as Skype and the online group discussion board. Although the online class had an optional two-hour lab, it was sparsely attended. The timing did not work for most students because most of them were taking it online due to work conflicts and the lab was held from 10:00 am to noon on Wednesdays. In addition, it was extremely rare that an entire group could meet during that time and, thus, the incentive to have the instructor answer questions in real time was offset by the lack of other group members' participation. A review of the group discussion spaces at the end of the semester revealed that these areas were heavily used for file exchange and ongoing conversations[2].

The F2F class had two 75-minute class sessions per week and met in a computer lab. Attendance averaged 98 percent and it was clearly evident that group members were interacting with each other during the class time. A review of the online group discussion forums indicated that about half of the class used these forums for file sharing, but that little discussion was occurring in these online discussion spaces.

[2] The course has since been offered in an online format several more times. The most recent model was to schedule open lab hours immediately after the F2F class in the late afternoon or early evening. This allowed the F2F students to continue working without interruption and was more convenient for the online students. Additionally, students in the online class were polled before the start of class. If they could commit to working during the lab hours weekly, then they were placed in a group to work together. This approach has worked well.

All projects were graded and each project was 5 percent of their overall grade. Peer evaluations were collected on each project and factored into the grade. Students were asked to split 100 points among the group members and were instructed to distribute them evenly if the work was distributed evenly, regardless of ability or inability to contribute. The ball was squarely in their court with respect to "free-riders". If group members wanted to allow a student to not participate, then they simply awarded equal points and each group member would receive the same grade. On the other hand, if a group member did not participate and the peer evaluations reflected this, then that was factored into the non-contributing member's grade.

Course Design Elements: Approach and Assessment: Online Quizzes and Exams

Each week the students had one to two quizzes that covered concepts, specific technical details and answers that could be obtained based on the deliverable for that week. There were a total of eighteen quizzes and only the highest ten were kept. The quizzes were designed to make sure the students stayed on task and also alerted them if they had incorrect numbers in their projects. They had 90 minutes to take the quiz once it was opened and were allowed one attempt. Quizzes were due at midnight on Sundays (the same time as the weekly deliverables) and answers were available at 12:01 am on Monday.

Exams were also given online, although the F2F class took them in the lab. Online students had a 72-hour window in which to take the exams and were allowed 90 minutes to complete the exam once they started it. The F2F class also had 90 minutes if they showed up early or left late from the class (the class was 75-minutes long). The focus of the exams was on project results and the ability to use the information and reports that were generated. As indicated earlier, they were expected to answer business questions that would be asked of them in practice.

Course Design Elements: Approach and Assessment: Discussion Board

Weekly discussion questions were assigned for the first half of the semester to both classes. The questions were designed to help the students verbalize the difficulties that they were having with the projects. For example, the question in week two was: "What makes the manual project difficult? What challenges do you face? What assumptions do you need to make? What skills from previous classes do you need that you may have forgotten? What skills do you need that you never had in any other class?". The goal was to have them discuss their difficulties, which allowed the instructor to respond and classmates to commiserate.

Grading was based on a rubric and was a small percentage of their grade (2%). The rubric was posted to the course management website so that the students could see exactly how they were graded. Grading criteria included posting frequency, initial assignment posting, follow-up postings, content contribution, and clarity and mechanics. The rubric was also uploaded to the course management website for use in semi-automated grading. It was possible to click on the student and see all of the posts they made, including initial posts and follow-up posts. The rubric was also available in the grading section, and a simple click on the appropriate box for each criteria facilitated grading. By using the semi-automated grading system, grading was not blind. The potential for biased grading did exist, but did not seem to be a factor when grading was done as a batch.

Mid-semester feedback indicated that students did not find the discussion questions useful. On the contrary, they saw the questions as busywork. In response to this feedback, an open-ended discussion forum for questions was created during the second half of the semester, which students could contribute to voluntarily. End-of-semester feedback indicated that the voluntary discussion approach was well received.

Course Design Elements: Software Resources

There were two required textbooks for the course, one for QuickBooks and the other for Excel. Assignments were taken from the end of chapter cases for each of these two books. Neither the manual project nor the Peachtree project had an assigned textbook, although an optional Peachtree textbook was suggested.

Online students had access to QuickBooks through the software provided with the textbook. The college purchased 75 licenses and installed them in two computer labs on campus for use by the F2F students and any online students that wanted to come on campus. In addition, 10 licenses were reserved for students with Mac computers (the provided software did not work on Macs). These students could access the software through a virtual private network (VPN) using their college ID. Peachtree (which is free to universities) was installed on the computer labs and available to all students, online and F2F, through the VPN. Students were asked to have Excel at the start of the course, although this was also available through the VPN.

The majority of the course instruction, for both courses, was provided through recorded videos. The QuickBooks text came with about 20 videos and these were provided to the students on the course website. No additional videos were prepared for QuickBooks.

The instructor prepared approximately 45 videos with TechSmith's Camtasia software and uploaded to the course website. These videos captured the lectures that had been given in previous semesters. Lectures provided theoretical material and critical "how-to" material. One disadvantage of teaching in a lab is that each student works at a different pace, so doing a demo of the material is not productive. In addition, many of the students do not pay attention, being easily distracted by the many wonders of the Internet in front of them. As such, with the videos, students could listen to them and then refer back to them if they got to a point in the project where they are stuck.

Course Design Lessons Learned: Results—Comparing Outcomes between Online and Face-to-Face Students

The instructor used two measures to assess the outcomes of delivering the AIS course material in the online and face-to-face delivery modes: course grades and scores from university-standardized course evaluations. However, the assignments and grading protocol were exactly the same between the two courses, so potential bias about course delivery mode was not an issue. An analysis of the grades for the two courses indicated that the distributions were nearly identical. As Figures 3 and 4 show, the mode for each class was "B" and both classes had an approximate bell curve. There were two students who failed each class and the number of withdrawals was slightly higher for the F2F class. Withdrawals would only show up in the grade distribution if they occurred after the first two weeks. Anecdotal evidence suggests that grades in online classes are lower and that more students drop out. In this case, three students from the online class dropped in the first week of class when they realized that the workload was very high. Only one student dropped in the first week of class from the F2F class.

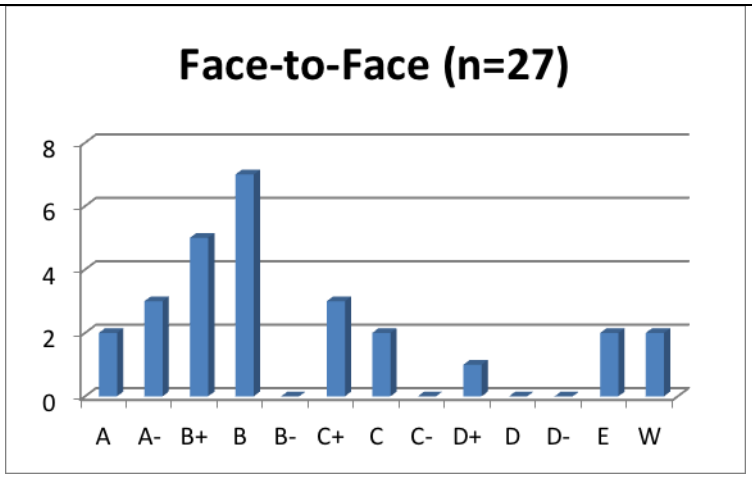

Figure 3. Grade Distribution Face-to-Face Students

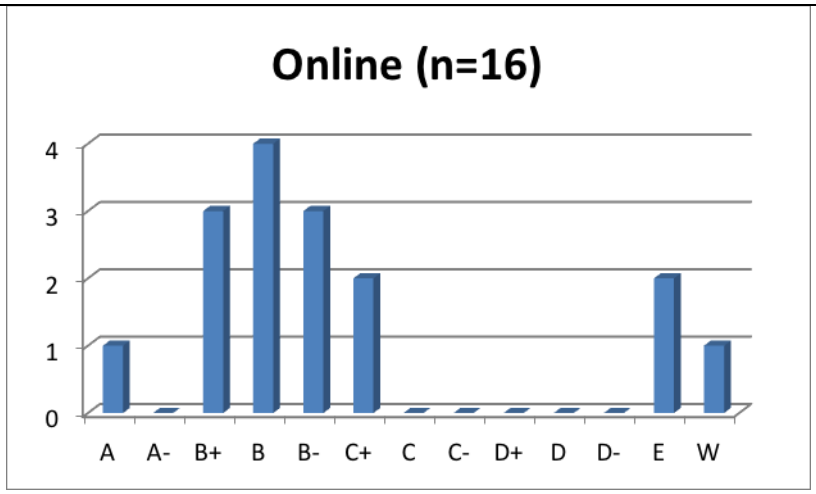

Figure 4. Grade Distribution Online Students

A review of the university's course evaluation scores for these sections indicates a somewhat surprising result. The course evaluation instrument asks for student ratings of course dimensions using a Likert scale of 1-5, where 1 =

Excellent, 2 = Very Good, 3 = Good, 4 = Fair, and 5 = Poor. As Table 1 shows, the student evaluation scores for the online course were significantly better than the student evaluation scores for the F2F section (lower is better)[3]. Additional qualitative feedback from the F2F class indicated that the lab format was not comfortable for all of the students. They preferred a traditional lecture during regularly scheduled class time. On the other hand, the online students had no expectation of sitting in a classroom being lectured to and were very responsive to the videos and the very quick turn-around for their email questions.

Table 1: Course Evaluation Scores

	Face-to-face	Online
The course as a whole was:	1.94	1
The course content was:	1.78	.5
The instructor's contribution to the course was:	2.72	1
The instructor's effectiveness as a teacher was:	2.72	1

Course Design Lessons Learned: Insights

Both classes liked the group work. The projects were sufficiently challenging that all students valued the opportunity to talk out issues. The online class reported spending many hours on the phone and Skype while puzzling through the transactions in the manual project and forming bonds with their teammates. The F2F class indicated that they met outside of class to complete work that was unfinished at the end of lab hours. Most groups did not indicate that they worked virtually. Due to the peer evaluation process, slackers were given lower grades, which made it fairer for contributing members. One student from the online class consistently received failing grades on the project because she did not do any work on it throughout the week and her group members would work on the project every day.

As indicated earlier, the optional lab for the online class was not used. It was an inconvenient time for most students and the fact that they could not meet F2F with their group members during that time was a deterrent for those few students who could make it to the lab. On the other hand, class attendance in the F2F class indicates that they valued the lab time.

Both classes had access to the videos and used them. However, the F2F class still wanted a traditional lecture (without fully understanding that more lectures meant less lab time) and the online class appreciated the videos because they knew that traditional lectures were not an option.

One hazard of online classes is students' expectation that the professor will be available 24/7, and one student in the class was very upset if it took more than two hours for the professor to respond. This did not occur in the F2F class, although student emails outside of class were very common. They were appreciative if the professor got back to them before the next class.

Course Design Lessons Learned: Online vs. Face-to-Face: What is Optimal?

The resources developed for an online class were an added plus for students in the F2F class to provide them with additional learning resources. A lab class is definitely not an ideal setting for lectures and the videos removed the need for lecturing during the class. However, since F2F classes typically have lecture time, it can be a challenge to get students to accept the "flipped classroom" and encourage them to listen to the videos before they come to class.

One advantage of an online class is that students expect to "teach themselves", which removes their expecting a "sage on the stage" during regularly scheduled class time. It is important that students learn the same material regardless of the format it is given. Since both classes yielded the same grade distribution, it appears that learning occurred in both classes.

Course Design Lessons Learned: The Future

AIS classes are difficult course to teach. Many students are attracted to accounting because it is perceived as "nice and neat", but AIS classes are messy. Regardless of the content, they are being forced to do things outside of their comfort zone. As we move into the future, we should consider providing essential resources to both F2F and online classes to strengthen students' learning experience. Students should be able to take the course in either format and

[3] Student evaluation scores continue to report much better for the online class than the F2F class, although the F2F scores are improving.

achieve the same results. Resources that support active learning should be encouraged, and the only difference between the two courses should be whether student groups are working together physically or virtually.

Nicole Forsgren, Utah State University—Learning by Building

Nicole shared results of her AIS course design while at Pepperdine University, including two active projects that required students to learn AIS content by building small information systems complete with internal controls.

Course Background: The Program and Stakeholders

Pepperdine University has a relatively small accounting program housed in a liberal arts college, with all students required to complete extensive coursework in the liberal arts in addition to their accounting courses. Approximately 20-30 students graduate each year, with more than half achieving placement in big four firms at competitive salary levels. Approximately one third of the graduating students place at large regional accounting firms, with the remaining graduates going on to graduate school or accepting positions in accounting departments in companies. The university's accounting advisory board felt strongly that students should have information systems instruction in the accounting core, but did not limit this instruction to any particular technology. The course was required for all accounting majors, and was required for accounting minors who selected the managerial (vs. financial) emphasis. The course, as described below, was offered in the Spring 2011 and 2012 semesters.

Course Design Elements: Approaches and Software Used

The course was based on the AIS course developed by Karen Otto at the University of Arizona, and comprised lectures, homework, quizzes, exams, and two big projects. Lectures introduced the material and included several practice sets and exercises to give students experience with the material. Homework assignments covered the material from the classroom, and quizzes followed homework exercises to check students' learning. The course referenced key sections of Romney and Steinbart (2012) textbook, but supplementary material was provided for key sections, such as normalization. Course content focused on the revenue and expenditure cycles and was delivered in the following order: REA modeling, normalization, flowcharting, internal controls, and broad topics in IS. For example, the students took a tour of the campus IT lab where physical concerns such as power, space, and cooling issues were highlighted. There was also a discussion of physical internal controls such as access, door locks, and confidential materials recycling. In the classroom, the basics of IT security and IT auditing were covered.

Course Design Elements: Assessment—Exams

The first exam assessed students' learning of REA, normalization, cardinality, and database table structure. The second exam assessed students' learning of internal controls, with a focus on identifying weaknesses, threats, and recommending control procedures. The final exam used the Baim method (named after Dean Baim, a professor at Pepperdine who has done something similar for years). The Baim method uses a comprehensive final exam and, if students earn an "A" on the final, it can replace any prior exam scores. This acknowledges the fact that REA and other concepts can be difficult to master early, but. with enough practice, can be learned well. This allows the students to truly learn from their mistakes and apply the concepts throughout the course and to the two involved projects and be able to get a good grade at the end of the semester.

Course Design Elements: Assessment—Projects

The goal of the projects was to foster students to more deeply understand the course material and allow them to see the application of the material covered in lecture and homework. Both projects dealt with a fictional company, with the second project building on the first. Each student team included 3-5 members and three class days were devoted to each project (total six project days for both projects). The instructor created the teams to ensure a mix of students who reported comfort with technology and those who had taken the audit course.

The first project dealt with the revenue cycle. A written case study provided the necessary facts and background for the project and included information necessary for an REA diagram and an evaluation of internal controls. Students were also provided with Excel spreadsheets of the company's current data, which required normalization prior to being imported into a database. Theoretical concepts such as normalization and internal controls were implemented through the REA model, database design, data cleaning and importing, an internal control summary, and internal control matrices. The project was then implemented in Access. Additional deliverables included an engagement letter, a statement of generally accepted accounting principles (GAAP), and project flowcharts.

The second project built on the first and was expanded to include the expenditure cycle. In some respects, this project, which included the same deliverables as the first project, was easier. The students obtained an understanding of Access, internal control matrices, and other technical details in the first project. However, in other respects, it was more difficult. Students were asked to improve the system in non-obvious ways and were not

provided with the step-by-step guidance they had with the first project. They were asked to apply what they learned in the first project in new and different ways.

The students were given the base requirements for both projects (base requirements would earn them 70% of the total points possible) and it was left to them to decide the best ways to improve the project. With respect to implementation, the first project's base requirements included tables, relationships, forms, queries, and reports. The second project included tables, relationships, queries, and reports, and any reports were expected to be more advanced than those included in the first project. Forms were no longer coded in the database in the second project: teams create detailed design documents that they would give to a programmer. This simulates the probable responsibility of accountants on a development team. In all cases, any technical challenges or questions could be brought to the instructor for full help with implementation, but the students had to identify the core idea (e.g., a difficult report or advanced form-based control). This emphasized the need to think in detail about internal controls and managerial accounting information that could be gleaned from the new system, without penalizing teams for their lack of advanced programming skills.

Course Design Lessons Learned

Higher-level learning occurs when students have an opportunity to practice what they read and hear. The goal of the projects was to achieve this higher-level learning. Students were strongly encouraged to professionally bind their projects and take them into interviews as a portfolio. The required documentation for these projects provided an opportunity for the students to speak knowledgably about the subject matter and produce evidence of analytical skills and writing abilities.

The focus on documentation made this more than just a database project and was more appropriate for the accounting student. Although students needed to develop the database, these were not MIS students. As future accountants, they are more likely to document an existing system than develop a new system. Despite this focus, the course material was very much a new language and a new way of thinking about things, particularly for traditional accounting students. The students were warned up front that it may be frustrating, which helped them to embrace the material and dive in.

In terms of hiring, the big four firms love the exposure Pepperdine students get to systems through this course and the projects. They are seeing positive impacts in all areas and especially in the advisory services area of their firms. Students not interested in the big four also reported a great benefit in terms of both interviewing and interest/exposure to something new; in fact, many reported that exposure to databases, queries, and reports in particular helped them stand out in interviews.

Chelley Vician, University of St. Thomas—Graduate AIS Course Design

Chelley presented the details of the course design for her masters of accountancy course at the Opus College of Business at University of St. Thomas–Minnesota.

Course Background: The Program and Stakeholders

The Master of Science degree program in Accounting (MSA) at the University of St. Thomas was 11-months long and included a paid internship with a Twin Cities public accounting firm, corporation, or financial services organization. The MSA coursework emphasized advanced technical content in accounting information systems (AIS), auditing, and emerging issues among other areas. Internship employers work closely with program staff and faculty to select students for each year's cohort and their development as new accounting professionals throughout the length of the program with hosted events, guest speakers, and professional development seminars. The MSA program has strong support from the Twin Cities' big four accounting firms and larger regional firms; hence, the program's curriculum provides additional education useful to CPA preparation and professional practice. Admission to the MSA program is competitive and, at the present time, requires an undergraduate accounting degree.

Course Design Elements: Topics and Rationale

The graduate AIS course provided a review of key, foundational concepts such as internal controls, transaction cycles, system documentation narratives and flowcharts, and general controls for information systems found in market-leading AIS textbooks. The graduate AIS course also provided deeper exposure to topical content in these areas: relational database modeling and normalization, business process modeling notation, integrated enterprise software systems (e.g., ERP), and governance concepts (e.g., COSO's enterprise risk management framework, COBIT, information technology governance). The course used three major forms of assessment: a term-long team project with a non-profit organization that involved an analytical review and documentation of a "system" that results in internal controls implications; multiple technology assignments that provide individual hands-on experience in exploring and using various software tools for accounting practice (e.g., documentation skills (Visio—system

flowchart notation, business process modeling notation), database modeling and implementation (MS Excel, Visio, MS Access), Extensible Business Reporting Language (XBRL, SEC Edgar website), and SAP (e.g., university alliances' curriculum for "classic rockers")); and exams. Student grades were based on individual scores achieved on the technology assignments, exams (mid-term and final), and the team score on the course project deliverables.

Course Design Elements: Software Resources

The goal of software usage in this graduate AIS course was to raise each student's level of awareness, comfort, and competencies in using the software to perform professional accounting tasks. The term-long course project challenged students to produce professional-grade client deliverables that exercise writing, analysis, process modeling, and synthesis skills in the context of accounting domain knowledge. The software experiences used to produce the client deliverables included MS Word, MS Excel, and MS Visio, and exposure to whatever conferencing technologies might be used to sustain client communication episodes and the software being used by client organizations.

A key element of the database technology assignment is the experience of taking spreadsheet data and transforming it into a usable and scalable database system. Numerous spreadsheets abound in corporate organizations (Panko & Halverson, 2001) that professional accountants will encounter, and there are times when the data is better suited for a database rather than a spreadsheet: this exercise gives students an opportunity to experience the differences and to recognize the importance of how data is structured and related. Students used MS Word, MS Visio, MS Excel, and MS Access in this exercise.

The XBRL assignment introduces students to XBRL's history, rationale, and current status mandated by the SEC and provided hands-on practice with actually tagging financial statements. Skill competencies included rules for XBRL documents, using the US GAAP and IFRS XBRL taxonomies, accessing the SEC EDGAR database and "interactive data" tools, and creating standard XBRL instance documents. Software used for this assignment included a text editor used for XBRL tagging, Web browser(s), and the SEC's tools for examining XBRL taxonomies and interactively exploring XBRL data.

The University of St. Thomas–Minnesota is a member of the SAP university alliance (see http://uac.sap.com for more information) and used some of its curriculum in this graduate AIS class to address learning goals. The "classic rockers" curriculum dataset, developed by professors at Sam Houston State University in Texas, addresses two key learning objectives: (1) hands-on experience with enterprise, integrated software used in corporations to experience end-to-end business processes and transactions (e.g., sales, distribution, materials management, production, financial tracking, and reporting); and (2) analysis of internal controls present in such enterprise-level software systems—both general and application level controls. Students completed business transactions in the SAP software for sales of rocking chairs, which included managing materials inventories and production goods. This course planned to introduce some of the SAP university alliance curriculum for big data/analytics in future offerings of the course by which students will gain exposure to accessing and analyzing data generated by SAP business transactions in a data cube.

Course Design Lessons Learned

The term-long course project has now been running for three years in the graduate AIS course. Both students and clients have been favorably disposed to the project. Students have enjoyed working with actual clients and getting to apply the documentation skills for a real purpose and their accounting domain knowledge of internal controls to a new situation. The project also exercised their oral and written communication competencies, along with their teamwork and project management skills. Clients have reported that the projects have helped them understand more about their business processes and gain ideas for improving their internal controls and systems.

The technology assignments have been a good way for individuals to practice and master their software technology skills. In the case of corporate software experiences (e.g., XBRL, SAP Business Suite), it is difficult to ascertain currently how these course experiences might translate to future career effects. The course has just begun to use the SAP software, and the efficacy of this approach appears positive, but it is still too early to determine its long-term effectiveness. In the case of XBRL, although the SEC mandates presenting information in XBRL format in company filings, the current audit standards do not address the assurance of XBRL information. However, the regulatory trend appears to be moving toward some form of external assurance on the XBRL data by a third party, so public accounting firms conducting firm audits for SEC clients may soon be asked to address the XBRL-tagged financial data in the audit outcomes. If this trend comes to fruition, there will be a need for deeper understanding of XBRL tagging and accounting expertise in the professional accounting field, whether this is done by public accounting firms or private companies.

IV. SESSION DISCUSSION, FUTURE CONCERNS, AND PRESSURES FROM PRACTICE

Session discussion focused on specific questions related to how panelists use software tools (e.g., QuickBooks, Peachtree, XBRL, SAP), sample exercises, and costs to use such learning experiences in the classroom. Each panelist reiterated their email contact information and offered to share resources with other educators if requested.

Another item raised by a session participant for discussion was the point that accounting information systems courses, no matter the content, deal with matters and topics that require learners to exercise judgment and flexibility rather than the mathematical computation of a "right" answer to a problem. Hence, learners in an AIS course are challenged to "think outside of the box" to find solutions involving information systems and there may be "no one right answer" in the case of:

- Multiple good ways to show how a process or data is modeled
- How to use software to support business processes or business needs, and
- How to combine people, processes, and technologies to create an information system that meets business needs with internal control requirements.

Subsequent to the panel session in August 2012, additional industry events occurred that will affect AIS course content in the future. In a discussion session at the 2013 AIS Educator's Conference in Laramie, Wyoming, a conference participant highlighted a recent change in The Association to Advance Collegiate Schools of Business (AACSB) accreditation standards for accounting accreditation related to learning competencies for emerging information technologies (AIS Educator Conference Participant, personal communication). In particular, the statement refers to the change made to Standard A7 of the 2013 Accounting Accreditation Standards (emphasis added):

> *Consistent with mission, expected outcomes, and supporting strategies, accounting degree programs include learning experiences that develop skills and knowledge related to the integration of information technology in accounting and business. Included in these learning experiences is the development of skills and knowledge related to* ***data creation, data sharing, data analytics, data mining, data reporting, and storage within and across organizations****. (INFORMATION TECHNOLOGY SKILLS AND KNOWLEDGE FOR ACCOUNTING GRADUATES—NO RELATED BUSINESS STANDARD).* (AACSB, 2013).

This noted change in AACSB accounting accreditation underscores the importance of revamping AIS curriculum to plan for data's importance in business organizations; that is, the capture, storage, security, and usage of data in business decision making and financial reporting. The specifics of the standard draw attention to the burgeoning topic of business analytics and big data and suggest the importance of cloud computing environments and bring-your-own-device (BYOD) issues for accounting and information systems practitioners. The importance of the challenges involved with emerging technologies of big data and business analytics was also emphasized in a 2013 Annual Meeting of the American Accounting Association presentation by David Steier, Director, Deloitte Consulting, entitled "Big Data in Accounting: Opportunities and Cautions" (Steier, 2013).

Another pressure on the AIS course comes from accounting practitioners, especially the large public accounting firms involved with SEC clients. Many large public accounting firms have been recently subjected to PCAOB audits, and, in the course of these externally imposed audits on firm work, these firms have begun adapting their internal workflows and processes to achieve better outcomes for their firm clients and these externally mandated reviews. During another session at the 2013 AIS Educator's Conference, it was reported that at least one of the large public accounting firms has now mandated that staff are expected to use systems documentation techniques on all SEC client audit work in order to document the processes involved in producing, using, and protecting financial, managerial, and other information at the heart of the audit work (AIS Educator Conference Participant, personal communication). From Ron Premuroso's survey results, our panel indicated that the topic of "systems documentation", which emphasizes systems flowcharts, data flow documents, and REA modeling, is quite evident in existing AIS course designs. Clearly, the feedback from accounting practitioners is that this topic will remain important for graduates into the future as a way of making sense of large, integrated software systems that support business financial performance.

V. CONCLUSION

As mentioned earlier, there are multiple ways of teaching the AIS course, and multiple topics can be emphasized. The course direction should be influenced by the employer base that will be hiring students from a given university. Regardless of the topic coverage in a given course, the AIS course is distinctly different from other accounting courses in the curriculum. Students are forced to step outside of their comfort zone and move away from journal entry-based knowledge. They need to recognize that there may be more than one way to achieve an objective.

There is little room in this course for "memorize and regurgitate" as everything from documentation to setting up a new database requires students to achieve at least the synthesis level of learning. Depending on when this course is offered in the curriculum, this can be a tremendous stumbling block to students.

Additionally, any time software coverage is included in a class, students need to understand that a "point and click" approach to projects does not foster learning. They need to understand why they are doing things in a certain way for two reasons. First and foremost, they are not likely to see exactly the same software in the job that they saw in the classroom. Without an understanding of how the software works, students are unable to transition their skills learned in a classroom project into a new software environment. Perhaps even more importantly, students who work through projects without thinking about what they are doing will be unable to recognize anomalies and figure out how to correct them. This is part of what sets the AIS course apart from a community college course in QuickBooks: they are not being trained on the software but, instead, are being educated on what the software should do, which enables them to take control and better manage both the input and output of the system.

Table 2 summarizes the various approaches taken by panel members that shared specific course designs. The table summarizes the role the course plays in the curriculum, course design elements, and lessons learned. Common themes emerge such as team-based projects and software integration. On the other hand, again based on stakeholder needs, the table highlights several differences, most prominently the courses' topical coverage. From this table, we could indeed conclude that there is some truth to the old joke of five AIS educators teaching the course six different ways.

Table 2: Summary of Course Design Examples

	Background	**Course design elements**			**Lessons learned**
	Program, stakeholders & history	Topics & rationale	Approaches & assessment	Software resources	
Skip	Students pursue big 4-6 and consulting jobs; Course 1: Third-year course Course 2: Fourth year course	Transaction cycles, REA, relational databases, and Access Strategic IS and accounting issues, XBRL, and IS controls	Both courses: Lectures, lab sessions, and projects	Access Text editor for creating XBRL (XMLSpy is recommended)	Both courses: Students learn best with a combination of lecture, lab work, and projects.
Pam	Second-year course, students pursue corporate jobs as often as public accounting.	Accounting Transaction Cycle, Business Processes, Controls	Project Based, Quizzes and Exams, all projects done in teams	QuickBooks, Peachtree, Excel, Camtasia (for the instructor)	Students learn best with a hands on approach and the actual format of the course is unimportant (F2F vs. online).
Nicole	Undergraduate students, students primarily pursue big 4 and large regional accounting jobs	REA modeling, internal controls, revenue cycle, expenditure cycle	Two large projects completed in teams; individual homework, quizzes, exams	MS Access, Visio	Students learn best with complex hands-on projects where data, software, and controls are combined.
Chelley	Graduate-level students in cohort-based program; public accounting and corporations	Transaction cycles, Documentation; Internal Controls, Business Processes, Enterprise software	Two exams; term-long project with real client; technology assignments	MS Excel, Access, Visio; XBRL; SAP Business Suite	Students learn best with real situation synthesizing controls skills with knowledge. Hands-on work increases student confidence..

ACKNOWLEDGMENTS

We acknowledge the helpful participation of panel attendees at AMCIS 2012, the preliminary editorial comments provided by the *CAIS* Editor-in-Chief, Matti Rossi, and the useful review comments of the assigned associate editor.

REFERENCES

Editor's Note: The following reference list contains hyperlinks to World Wide Web pages. Readers who have the ability to access the Web directly from their word processor or are reading the paper on the Web, can gain direct access to these linked references. Readers are warned, however, that:

1. These links existed as of the date of publication but are not guaranteed to be working thereafter.
2. The contents of Web pages may change over time. Where version information is provided in the References, different versions may not contain the information or the conclusions referenced.
3. The author(s) of the Web pages, not AIS, is (are) responsible for the accuracy of their content.
4. The author(s) of this article, not AIS, is (are) responsible for the accuracy of the URL and version information.

AACSB. (2013). 2013 *Accounting accreditation standards—standard A7*. Retrieved from http://www.aacsb.edu/accreditation/accounting/standards/2013/learning-and-teaching/standard-a7.aspx

AICPA. (2014). Content and skill specifications for the uniform CPA examination. Retrieved from http://www.aicpa.org/BECOMEACPA/CPAEXAM/EXAMINATIONCONTENT/Pages/default.aspx

Arens, A., & Ward, D. (2012). *Systems understanding aid* (8th ed.). Okemos, MI: Armond Dalton.

Bain, C., Blankley, A., & Smith, M. (2002). An examination of topical coverage for the first accounting information systems course. *Journal of Information Systems*, *16*(2), 143-164.

Dillon, T. W., & Kruck, S. E. (2008). Identifying employer needs from accounting information systems programs. *Journal of Information Systems Education*, *19*(4), 403-410.

Dunn, C. (2012). *Resources-events-agents: An ontology for designing, controlling and using integrated enterprise systems.* New York, NY: McGraw Hill.

Herron, T., & Premuroso, R. (2012). *Results of a national survey of AIS educators*. Paper presented at the 14th Annual Accounting Information Systems Educator Conference, Estes Park, Colorado.

McCarthy, W. E. (1982). The REA accounting model: A generalized framework for accounting systems in a shared data environment. *The Accounting Review*, *LVII*(3), 554-578.

Murthy, U. S., & Ragland, L. (2009). Towards an understanding of accounting information systems as a discipline: A comparative analysis of topical coverage in AIS and MIS courses. *AIS Educator Journal*, *4*(1), 1-15.

Panko, R. R., & Halverson, J. R. P. (2001). An experiment in collaborative development to reduce spreadsheet errors. *Journal of the Association of Information Systems, 2*(4), 1-29.

Romney, M. B., & Steinbart, P. J. (2012). *Accounting information systems (12th ed.).* Upper Saddle River, NJ: Prentice Hall.

Steier, D. (2013). *Big data in accounting: Opportunities and cautions*. Paper presented at the Annual Meeting of the American Accounting Association, Anaheim, California.

Vasarhelyi, M. A. (2012). AIS in a more rapidly evolving era. *Journal of Information Systems*, *26*(1), 1-5.

APPENDIX A: TEXTBOOKS PRESENTED IN PANEL PRESENTATION SLIDE

Bagranoff, N. A., Simkin, M. G., & Norman, C. S. (2009). *Core concepts of accounting information systems* (11th ed.). Hoboken, NJ: John Wiley and Sons.

Bodnar, G. H., & Hopwood, W. S. (2010). *Accounting information systems* (10th ed.). Upper Saddle River, NJ: Prentice Hall.

Gelinas, U. J., & Dull, R. B. (2009). *Accounting information systems* (8th ed.). Mason, OH: South-Western.

Gelinas, U. J., Dull, R. B., & Wheeler, P. (2012). *Accounting information systems* (9th ed.). Independence, KY: Cengage Learning.

Hall, J. A. (2011). *Accounting information systems* (7th ed.). Independence, KY: Cengage Learning.

Hurt, R. L. (2010) *Accounting information systems* (2nd ed.). New York, NY: McGraw-Hill Irwin.

Kay, D., & Ovlia, A. (2012). *Accounting information systems: The crossroads of accounting and IT*. Upper Saddle River, NJ: Prentice Hall.

Romney, M. B., & Steinbart, P. J. (2012). *Accounting information systems (12th ed.).* Upper Saddle River, NJ: Prentice Hall.

ABOUT THE AUTHORS

Pam Neely is an Assistant Professor of Accounting at the College at Brockport–SUNY. She earned her PhD in Information Systems from the University at Albany, and her MS in Accounting from the University of Colorado. Her research interests include data and information quality, as well as the relationship between fraud detection and social media. Pam has published in the *Journal of Information Systems, Communications of the Association for Information Systems, International Journal of Information Quality,* and *the International Journal of Business Intelligence Research*, among others. Pam is a CPA with 20 years of industry (both public and private) experience prior to full time work in academia.

Nicole Forsgren is an Assistant Professor in Management Information Systems and Accounting in the Jon M. Huntsman School of Business at Utah State University. She earned her PhD in Management Information Systems and her Masters in Accounting from the University of Arizona. Her research interests include knowledge management and knowledge management systems, IT use and impacts, business intelligence and analytics, and accounting information systems. She holds a patent and her work has appeared in *IBM Journal of Research and Development* and *Journal of Information Systems Education*.

Ronald Premuroso is an Associate Professor in the Department of Accounting and Finance in the School of Business Administration at the University of Montana. He holds degrees from Florida State University (B.S.) and Florida Atlantic University (MBA and Ph.D.), and is a CPA as well as a Certified Fraud Examiner. Prior to joining the faculty at Montana, he was employed by KPMG, LLP (audit) and Sensormatic (Executive Leadership team member). His research includes real-world applications related to voluntary financial statement disclosures by firms and technology trends for accounting. Ron serves on the editorial boards of *Issues in Accounting Education* and *International Journal of Accounting Information Systems*.

Chelley Vician is an Associate Professor of Accounting in the Opus College of Business at the University of St. Thomas. She holds a PhD from the University of Minnesota, an MBA from the University of Notre Dame, and a B.A. in Accounting from Mundelein College (Chicago). Prior to her academic career, she worked as an information system professional in banking, health care, fundraising, government, and education sectors. Her expertise includes information system and internal controls design and review, project management, information systems planning – development – implementation across multiple system platforms, data and process modeling, databases, and enterprise systems (e.g., SAP). Her research includes e-learning, computer-mediated communication anxiety, and accounting information systems. Her research has appeared in journals such as *The Data Base for Advances in Information Systems, Group Decision and Negotiation*, *Journal of the Association for Information Systems*, and *Communications of the Association for Information Systems,* and numerous conference proceedings. She serves as Senior Editor at the *ACM Data Base for Advances in Information Systems* and is an Associate Editor at *Communications of the Association for Information Systems.*

Clinton E. White, Jr. (Skip). Skip earned his DBA from Indiana University and his MBA from the University of Louisville. Currently he is the Associate Chair for MIS in the Department of Accounting & MIS at the University of Delaware and the author of *The Accountant's Guide to XBRL* and *The Guide & Workbook for Understanding XBRL* (www.skipwhite.com). Skip has published numerous articles in academic and professional journals, conducted numerous academic and professional workshops around the world, and was the founding Webmaster for the American Accounting Association. His recent efforts have been focused on XBRL and other emerging XML-based technologies and their effect in various areas of business. In addition to faculty positions at Penn State (1981 – 1987) and Delaware (1987 to present), he received his BA in History & Government from Western Kentucky University (1969), served as a Military Intelligence Specialist in the First Special Action Force –Southeast Asia (1969 – 1971) and worked as a Branch Manager and Loan Officer at a Savings & Loan in Louisville, Ky. (1974 – 1977). For details see: http://www.lerner.udel.edu/faculty-staff/faculty/clinton-white.

Communications of the Association for Information Systems

ISSN: 1529-3181