Does Using Real Organizations for Team Projects in an AIS Class Make a Difference?

Sonia Gantman
Bentley University, sgantman@bentley.edu

Abstract

This paper explores the impact of substituting a field-based component of a semester-long team project in an Accounting Information Systems (AIS) course with a book-based alternative. Traditionally, the project required students to interact with a real organization to document and analyze business processes. To address time constraints and curricular adjustments, a version utilizing a comprehensive ERP manual instead of working with a real organization was introduced. The differences between the field-based and book-based versions of the project have been assessed by comparing students' perceptions of their professional competencies and their appreciation for the AIS course. The results indicate that while the book-based project is less time consuming, it does not fully replicate the experiential learning benefits of the field-based approach, particularly in risk management and control concepts. The findings suggest that, although removing the field component may streamline the course, it diminishes key learning outcomes. Analysis and possible alternative solutions are discussed in the concluding section of the paper.

Keywords
Field experience, AIS project, AICPA Core Competency Framework, experiential learning

The contemporary business environment—complex, computerized, and high paced—offers graduating accounting majors a variety of employment opportunities, many of which did not exist only a few years ago. Automation of mundane repetitive tasks and the use of advanced technologies and artificial intelligence (AI) at the workplace shifts the emphasis toward soft skills and critical thinking. Among the competencies expected by the industry from college graduates with an accounting degree are interpersonal communication, analytical thinking, teamwork, dealing with stress and ambiguity (e.g., Lawson et al., 2014), and even emotional intelligence (Daff et al., 2012). This is alongside the exponentially growing demand for technical skills, and the intensive efforts of accounting educators to adjust the curricula to the current requirements and expectations.

Adding technology and data analytics training to existing curriculum is challenging. New exercises, projects, or whole modules may need to be included in existing courses, and this often means something else should be dropped to make room for the new material. Some schools go as far as restructuring the whole curriculum (Fedorowicz & Gray, 2021), but not every accounting department can afford such extensive changes. There are even those who recommend that, given the need to prioritize, accounting programs should focus on the technical side of the profession and give up "soft skills" that are hard to define, hard to measure, and hard to teach (Rebele & St. Pierre, 2019).

This paper reports on an attempt to alter a semester-long team project in an AIS class to make it less time consuming. The initial version of the project included a field component (i.e., finding a "client" organization and interviewing people about a business process), followed by creating business process documentation and analyzing internal controls. Handing students a comprehensive ERP manual instead of sending them to interview people in organizations significantly cuts down the time and effort needed to complete the project while still allowing students to achieve the main learning objectives of generating business process documentation and analyzing controls. The motivation for this study is therefore very practical. Its purpose is to assess the added value of the field component of an experiential AIS project by comparing the perceptions and attitudes of two groups of students—a group that completed the project in a real organization (field-based version) and a group that completed it in a purely academic setting (book-based version).

In the next section, I briefly review the relevant literature arguing in favor of working with real organizations for college projects but recognizing the caveats of this practice. The two versions of the project are presented in the following section. After that, I discuss the methodology and results of comparing the two groups and conclude with discussion of the findings and limitations.

Background

The close connection of practice and academia is an important and distinctive characteristic of the professional accounting community. Discussions of the best ways to educate future accountants date back to as early as the 1960s (Bolt-Lee & Foster, 2003). The contemporary approach to accounting education driven by the Core Competencies Framework (AICPA, 2018) recognizes the importance of developing business and professional competencies along with accounting competencies.

Project-based "learning by doing" is a widely used teaching approach that is known to result in significant improvements in students' instrumental, systemic, and interpersonal skills, especially in decision-making and problem solving (Gallego et al., 2018). A service-learning component brings additional benefits. Hoxmeier and Lenk (2003) discuss these benefits for accounting education, drawing on Jacoby's (1996) definition of service-learning as "a form of experiential education in which students engage in activities that address human and community needs together with structured opportunities intentionally designed to promote student learning and development." This definition matches the field-based AIS project described later in this paper, specifically the part of finding a client organization and interviewing its employees and managers.

While the literature recognizes the benefits of including exposure to the real business world in the accounting curriculum, there are also words of warning. Butler et al. (2019) note that service-learning projects in accounting classes require much more supervision and demand consulting and coaching skills from the instructor. Rose et al. (2005) compared a class with a service-learning project and traditional textbook, a class with a service-learning project without a textbook, and a control group in a traditional learning environment. The participating instructors with a service-learning project reported about a 50% increase in required office time and the need to be more flexible and to deal with contingencies. Rose et al. (2005) argue that students in the service-learning environment also need much more flexibility and the ability to deal with contingencies compared to what would be required in a traditional academic setting. My personal observations and conversations with students confirm these findings. It is the service-learning ("field") component of the project that generates contingencies and coordination challenges and contributes the most to the high time and effort demands of the project.

The need to fit more material in one semester increases the "opportunity cost" of time-consuming assignments and motivates the need to assess the differences in student outcomes and perceptions between the two types of projects. While eliminating the AIS project altogether is not feasible, it is worth exploring the possibility of keeping the parts of the project directly related to mastering the textbook material and eliminate the more time-consuming "field component." This study compares the outcomes of the two versions of the project (book-based and field-based), with the goal of assessing the added value of the field-based component. The assessment examines two types of outcomes associated with the following research questions:

- RQ1: How does the presence of the field component in the AIS Project affect the students' perceptions of their professional competencies?
- RQ2: How does the presence of the field component in the AIS Project affect the students' appreciation of AIS class?

The AIS Project

The AIS project described in this paper is a semester-long team project based on the "Bentley Team Project" by Gelinas et al. (2018) that is offered as a supplement to their AIS textbook. This project aligns with the material covered in the textbook and requires application of most of the material discussed in class and tested on the exams. The project has been used for over 25 years at Bentley University by Professor Gelinas and his colleagues. I have used it for several years prior to conducting this study. The project accounts for 35% of the course grade in my classes.

The project's objectives are:
- Examine an actual business process in operation;
- Document it using a narrative description, table of entities and activities, context diagram, and systems flowchart;
- Analyze measures that are in place to control the process and its data; and
- Recommend changes to the process, such as additional controls, to improve operational and information process effectiveness.

Table 1 outlines the main phases and deliverables of the original ("field-based") AIS project alongside its altered ("book-based") version. The students working on the field-based version of the project were required to find a client organization, select the process to study together with the client, and gather information about the process through interviews. Alternatively, the students working on the "book-based" version used a comprehensive Oracle Fusion manual to gather information about a specific business process assigned by the instructor.

Table 1
The Comparison of Two Versions of the Project

Field-based version	Book-based version	Deliverable	Timeline
0. Team building and looking for a client			Weeks 1–4
1. Submit a proposal	1. Submit a work plan	Project proposal	Week 5
2. Interview the client and document the business process	2. Study the manual and document the business process	Business process documentation	Week 9
3. Control analysis and recommendations to the client	3. Control analysis, assessment and recommendations	Final submission	Week 14

During the first phase of the field-based version, teams brainstorm their options based on their interests and personal and professional networks, and eventually secure a "client" organization willing to work with them. The deliverable of the first phase is a proposal, which includes a description of the organization and the business process to be studied, a work plan, and a first draft of interview questions.

In the book-based version of the project, the teams recreate processes using the Oracle Fusion manual. The manual provides detailed instructions for performing various tasks in Oracle ERP such as creating a new customer purchase order or finding a purchase order to compare against received goods (Oracle, n.d.). The business process for each team was assigned by the instructor. The deliverable included only the team's work plan. Looking for a client and scheduling an interview is an unpredictable process full of contingencies, so the elimination of this stage in the book-based version allowed for starting the project a few weeks later.

In phase two of the project, the teams create documentation for the business process, using their interview notes (field-based version) or the Oracle Fusion manual (book-based version). In both versions, the instructor provides

guidance and meets with teams to review their drafts when appropriate. All teams submit a set of business process documents as a deliverable for phase two, including a step-by-step narrative, a table of entities and activities, a context diagram, and a system flowchart.

In the final phase of the project, the students analyze the process's internal controls based on their documentation and create a report. Teams working on the field-based version of the project are encouraged to share their final report with the client. In both versions of the project, the teams submit written reports and present their work in class.

Methodology

The purpose of this study is to assess the impact of the AIS project by comparing students who worked on a field-based AIS project with students who worked on a book-based version of the same project. The study was conducted in a medium-sized, private liberal arts college. The accounting program in this college is relatively small (about 80 accounting majors every year), with most accounting majors following the same sequence of accounting classes (Figure 1). As indicated in Figure 1, the AIS class is a pre-requisite to the audit class. Most accounting majors complete the AIS course during their junior year and have an internship the following summer. The audit class is only offered in the fall semester of their senior year.

Figure 1
The Critical Path for Taking AIS and Audit Classes
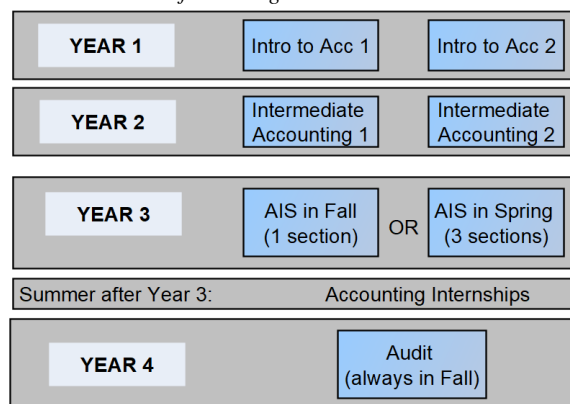
This study was conducted over three semesters by two different instructors; however, in each given semester, all sections were taught by the same instructor and used the same version of the project. The students did not select the project version (book-based or field-based) as it was determined by the instructor. The difference in AIS class material was the field- or book-based version of the project. Everything else associated with the class (e.g., textbook, homework, assignments, and exams) remained the same. In addition, there are no identifiable statistical differences in the experiences of the students in two groups—all the students are accounting majors at the same institution, and due to the rigid structure of the program and the relatively small size of the accounting department, most of the students had taken the same accounting classes with the same professors.

Instrument

I developed a survey to capture students' perceptions of their skills and learning experiences (see Appendix A). In addition to demographic data, the instrument includes two sets of variables: 1) "competencies set," reflecting students' perceptions on the level of their accounting competencies associated with technical and professional skills; and 2) "contributions set," for assessing the perceived contributions of different classes and activities to the development of the above-mentioned competencies.

The competencies set of variables is derived from the instrument of Daigle et al. (2007), which is based on the AICPA Core Competency Framework (1999). According to Daigle et al. (2007, p. 153), "The Framework provides a suitable foundation for accounting educators to flexibly determine course content and assess how well specific courses meet a student's acquisition of desired skills." Daigle et al. (2007) developed a comprehensive survey and captured the six functional competencies as identified in the 1999 version of the Framework (i.e., decision modeling, risk analysis, measurement, reporting, research, and use of technology). Most of the items in their instrument use the wording of bulleted descriptions of the competency elements in the Framework. Although I used many of these items as a basis for my instrument, I tailored the specific questions to the objectives of the AIS project. Specifically, I identified two functional competencies (decision-making and risk analysis) and three professional competencies

(collaboration, communication, and teamwork) in the Framework that are the most applicable to the AIS project's objectives. An additional competency, working with data, was created for the purposes of this study, and includes items from several different competencies of the Framework, namely research, resource management, and problem solving (AICPA, 1999). The more recent versions of the Framework (AICPA, 2018, 2022) also include these items, usually with slightly different wording.

Following the approach of Daigle et al. (2007), my instrument asks students to assess their competence and confidence levels associated with particular competencies. The competencies are assessed on a 6-point Likert scale,[1] with answers ranging from 1 ("strongly disagree") to a 6 ("strongly agree") with no neutral option. About half of the statements are negatively worded, with positive and negative statements alternated.

The second set of variables is contribution-based. The students were asked to assess the contribution of different components of their curriculum and other activities to the development of each competency. Anecdotally, feedback from former students indicated that many of them view AIS as one of their most useful college experiences for their careers, with many students emphasizing the role of the AIS project in their professional development. In addition, I received informal feedback that the AIS project deepened their understanding of material that they studied in other accounting classes. Therefore, I wanted to assess to what extent the field-based component of the project affects students' perception of the AIS class's contribution to their professional development, and if it also affects the perceptions of other curriculum components.

The contribution variables set captures students perceptions of contributions to their competency development by the following classes/activities: 1) financial accounting classes; 2) managerial and tax accounting classes; 3) AIS class; 4) general business classes; 5) non-business classes; 6) other education; and 7) personal experiences. This list was developed in consultation with colleagues who teach other accounting classes and advise students on non-accounting classes and extracurricular activities. The contributions data are captured with a sliding scale from 0 to 5, with increments of 0.5. The use of sliding scales makes the survey more visually engaging (Roster et al., 2015) and allows for collection of more granular data.

Data Collection

Anecdotal student feedback relayed that the summer internship helps in mastering the AIS class material and in understanding its importance. Therefore, the ideal time for measuring the impact of the AIS class is the very beginning of the fall semester. Notably, this timing is after completion of the summer internship for most students but before the students continue with other classes (e.g., audit) that would further improve their knowledge and skills.

The survey[2] was set up on the Qualtrics platform and administered during an audit class during the first week of fall semester. This setting was selected to ensure participation. Recall from Figure 1 that all senior accounting majors are enrolled in the audit class in the fall semester, with most of the students completing the AIS class with the business process analysis project during the prior spring term.

<div align="center">

Findings

</div>

Data

The survey resulted in 123 valid responses—79 participants (64.2% of the sample) completed the field-based version of AIS project, and 44 participants (35.8%) completed the book-based AIS project. There are no significant demographic differences between the two groups. All students are traditional college students, accounting majors, and senior-level students at about the same age range (21–24). In the field-based subgroup, 43 (54.4%) are males and 36 (45.6%) are females. In the book-based group, 27 (61.4%) are males and 17 (38.6%) are females. This slight difference in the gender composition reflects the typical ratio of male and female students at the institution.

Table 2 presents the competencies set of variables, measured on 6-point Likert scale. Likert data is technically ordinal and should not be analyzed with parametric statistical methods (such as means and variances). However, combining Likert variables into a composite index to capture a theoretical construct is an acceptable practice (e.g., Brown, 2011). A composite index was created for each of the six areas of competency in the study. Each index captures the average value of several (two to eight) variables measuring a specific competence. These indices are also listed in Table 2.

---

[1]Although Likert scales with an odd number of responses are more common, some argue that removing the neutral option forces respondents to take a stance, potentially leading to more accurate data (e.g., Kankaraš & Capecchi, 2024). As such, I used an even number of responses.
[2]The data collection procedures and the survey instrument have been reviewed and approved by the college's Institutional Review Board.

Table 2

"Competencies Set" (Variables Capturing Students' Self-Assessment of Competencies and Confidence)[a]

Variable	Description	Mean	Std. deviation
Working with information			
QData_1	Competency at identifying sources of information and reconciling conflicting or ambiguous data	4.67	0.683
QData_2	Competency at linking information, knowledge, and insights from different sources for decision-making purposes	4.95	0.867
QData_3	Competency at making analogies from problems solved in the past to new problems not explicitly described	4.80	0.735
QData_4	Competency at learning from non-academic experiences and at transferring knowledge from one situation to another	5.10	0.927
QData_5	Confidence in one's ability to work with different sources and different types of information	4.86	0.705
QData_6	Confidence in one's ability to evaluate the reliability of an information source	4.77	0.965
QData_7	Confidence in one's ability to apply their skills and knowledge in new situations	5.00	0.757
Risk and control analysis			
QRisk_1	Competency at identifying risks and analyzing possible negative outcomes	4.71	0.777
QRisk_2	Competency at identifying controls to mitigate the risks	4.54	0.977
QRisk_3	Competency at building appropriate models and technical documentation using appropriate software	4.59	0.913
QRisk_4	Competency at applying a systematic approach to risk analysis and control evaluation	4.28	1.066
QRisk_5	Confidence in risk analysis skills	4.38	0.752
QRisk_6	Confidence in understanding the concept of control and control evaluation skills	4.49	0.944
Decision-making			
QDesM_1	Competency at considering contingencies, analyzing the impact of potential actions, and proposing alternative solutions	4.80	0.757
QDesM_2	Competency at finding unconventional approaches and solutions to problems	4.58	0.923
QDesM_3	Competency at knowing when to follow directions, question plans, or seek help	5.35	0.600
QDesM_4	Competency at reasoning carefully and thinking effectively in abstract terms or generalizations	4.88	0.855
QDesM_5	Competency at managing stress and adapting to change	5.01	0.848
QDesM_6	Confidence in one's problem solving skills	5.08	0.997
QDesM_7	Confidence in one's decision-making skills	5.17	0.721
QDesM_8	Confidence in one's ability to develop action plan and adjust it as circumstances dictate	4.95	0.734
Collaboration			
QCollab_1	Competency at valuing inputs and points of view of others and facilitating development of consensus or compromise	5.15	0.568
QCollab_2	Competency at accommodating to the protocols and expectations of a team, and committed to team's common goals	5.20	0.842
QCollab_3	Confidence in one's ability to work in a team	5.41	1.040
Project Management			
QPM_1	Competency at prioritizing, delegating, and managing interdependencies in a team	5.07	0.770
QPM_2	Competency at managing time and resources	4.91	1.000
QPM_3	Confidence in one's project management skills	5.07	0.726

Table 2 (Continued)

"Competencies Set" (Variables Capturing Students' Self-Assessment of Competencies and Confidence)[a]

Variable	Description	Mean	Std. Deviation
Communication			
QComm_1	Competency at organizing and presenting information	5.10	0.620
QComm_2	Confidence in one's communication skills	5.09	1.064
Calculated Indices			
Data_Index	Average of QData_1 through QData_7	4.88	0.554
Risk_Index	Average of QRisk_1 through QRisk_6	4.50	0.662
DesM_Index	Average of QDesM_1 through QDesM_8	4.98	0.572
Collab_Index	Average of QCollab_1 through QCollab_3	5.25	0.591
PM_Index	Average of QPM_1 through QPM_3	5.02	0.632
Comm_Index	Average of QComm_1 and QComm_2	5.09	0.688

[a]All variables are measured on a 6-point Likert scale, where 1 is "strongly disagree" and 6 is "strongly agree."

It is also common in social sciences to use means analysis for single Likert items when the number of answer options is at least five (e.g., Norman, 2010). I included means and standard deviations in Table 2 as a part of variables description.

Table 3 summarizes variables capturing the perceived contribution of classes and activities to development of student's competencies. This is numerical data collected with a sliding scale from 0 to 5 with half-point increments.

Table 3

"Contributions Set" (Variables Capturing Students' Self-Assessment of the Perceived Contribution of Classes and Activities to Development of Their Competencies)[b]

Activity	Working with information	Risk management	Decision-making	Collaboration	Project management	Communication
Financial accounting classes						
N	123	121	123	122	122	123
Mean	4.15	3.15	3.93	3.71	3.80	3.91
Std. dev.	0.78	1.11	0.89	1.01	1.07	0.98
Managerial accounting and tax classes						
N	122	120	122	121	122	121
Mean	3.89	3.29	3.83	3.59	3.85	3.81
Std. dev.	0.79	1.12	0.82	1.03	0.96	1.04
AIS class						
N	123	123	123	122	123	122
Mean	3.15	3.96	3.22	3.35	3.81	4.05
Std. dev.	1.09	1.03	1.16	1.22	1.04	0.93
Other business classes						
N	123	120	123	123	122	122
Mean	3.51	3.03	3.52	3.83	3.79	3.98
Std. dev.	0.70	1.00	0.96	0.82	0.86	0.83
Other classes in college						
N	123	120	122	121	122	122
Mean	3.15	2.43	3.17	3.78	3.53	3.70
Std. dev.	0.87	1.07	0.99	0.89	1.01	0.91
Other classes elsewhere (high school)						
N	122	115	119	120	119	120
Mean	2.45	1.89	2.52	2.95	2.90	3.21
Std. dev.	1.02	0.94	1.12	1.11	1.17	1.12
Personal experiences (summer jobs, extracurricular activities, etc.)						
N	122	117	118	120	119	120
Mean	3.70	2.87	3.64	3.98	3.87	4.05
Std. dev.	1.10	1.28	1.27	1.15	1.19	1.07

[b]All variables are measured on a 5-point sliding scale with half-point increments and were prompted with the text "Please indicate how helpful the following activities were for developing your skills…."

Students' Perceptions on Their Professional Competencies

   Table 4 compares the distributions for competencies variables for students who completed the field-based version of the AIS project and those who completed the book-based version. This analysis is performed using the non-parametric Mann-Whitney U test.

Table 4

Comparing "Competencies Set" Means Using the Mann-Whitney U Test

		Field-based (79)		Book-based (44)		Mann-Whitney U test	
		Mean rank	Sum of ranks	Mean rank	Sum of ranks	Z	Asymp. sig.
QData_1	Identifying and reconciling sources	64.51	5096.0	57.50	2530.0	-1.212	0.225
QData_2	Triangulation of sources for decision-making	65.10	5143.0	56.43	2483.0	-1.459	0.145
QData_3	Applying past knowledge to new problems	62.94	4972.0	60.32	2654.0	-0.448	0.654
QData_4	Knowledge transfer, non-academic learning	62.82	4962.5	60.53	2663.5	-0.368	0.713
QData_5	Working with different sources	66.91	5286.0	53.18	2340.0	-2.374	0.018*
QData_6	Evaluate source's reliability	66.63	5263.5	53.69	2362.5	-2.147	0.032*
QData_7	Applying skills in new situations	65.28	5157.0	56.11	2469.0	-1.567	0.117
QRisk_1	Identifying risks and possible problems	64.06	4997.0	56.95	2506.0	-1.195	0.232
QRisk_2	Identifying controls to mitigate risks	67.96	5369.0	51.30	2257.0	-2.674	0.007**
QRisk_3	Modeling and tech documentation using software	65.74	5193.5	55.28	2432.5	-1.708	0.088
QRisk_4	Systematic approach to risk analysis	69.04	5454.5	49.35	2171.5	-3.063	0.002**
QRisk_5	Confidence in risk analysis skills	63.87	5046.0	58.64	2580.0	-0.856	0.392
QRisk_6	Understanding the concepts of control	69.09	5458.0	49.27	2168.0	-3.154	0.002**
QDesM_1	Considering contingencies and alternatives	63.34	5003.5	59.60	2622.5	-0.618	0.536
QDesM_2	Finding unconventional approaches	64.01	5057.0	58.39	2569.0	-0.902	0.367
QDesM_3	Following directions vs asking help	60.60	4787.5	64.51	2838.5	-0.657	0.511
QDesM_4	Abstract thinking and generalizations	64.19	5071.0	58.07	2555.0	-1.007	0.314
QDesM_5	Managing stress, adapting to changes	60.28	4702.0	63.66	2801.0	-0.546	0.585
QDesM_6	Problem solving skills	60.98	4817.5	63.83	2808.5	-0.463	0.644
QDesM_7	Decision making skills	61.06	4823.5	63.69	2802.5	-0.436	0.663
QDesM_8	Develop and adjust action plans	61.22	4836.0	63.41	2790.0	-0.363	0.716
QCollab_1	Valuing others' input and finding a consensus	61.64	4869.5	62.65	2756.5	-0.180	0.857
QCollab_2	Commitment to team's goals, adherence to protocols	60.59	4726.0	63.11	2777.0	-0.424	0.672
QCollab_3	Ability to work in a team	61.81	4883.0	62.34	2743.0	-0.092	0.927
QPM_1	Managing interdependencies	59.06	4666.0	67.27	2960.0	-1.416	0.157
QPM_2	Managing time and resources	61.32	4844.5	63.22	2781.5	-0.312	0.755
QPM_3	Project management skills	63.91	5048.5	58.58	2577.5	-0.948	0.343
QComm_1	Organizing and presenting information	62.89	4968.5	60.40	2657.5	-0.428	0.669
QComm_2	Communication skills	61.15	4830.5	63.53	2795.5	-0.381	0.703

   The means of composite indices are compared with a regular t-test in Table 5. As expected, the students in the field-based group feel most comfortable with collaboration skills, with the index of their self-reported competence in

this category being the highest (mean = 5.28), among the six. Also in line with expectations and previous findings (e.g., Daigle et al., 2007), the lowest of the six indices relates to risk management skills for both the field-based (mean = 4.63) and the book-based (mean = 4.26) groups.

Table 5
Comparing "Competencies Set" Means Using a t-Test

		Field-based (79)		Book-based (44)		t-test	
		Mean	Std. Dev.	Mean	Std. Dev.	t	2-sided p
Data_Index	Average of all "data" questions	4.95	0.531	4.75	0.575	2.004	0.047*
Risk_Index	Average of all "risk" questions	4.63	0.646	4.26	0.629	3.078	0.003**
DesM_Index	Average of all "decision-making" questions	4.97	0.605	4.98	0.512	-0.050	0.960
Collab_Index	Average of all "collaboration" questions	5.28	0.542	5.20	0.675	0.644	0.521
PM_Index	Average of all "project management" questions	4.98	0.706	5.08	0.472	-0.842	0.402
Comm_Index	Average of all "communication" questions	5.06	0.757	5.15	0.546	-0.651	0.516

*Statistically significant at 0.05
**Statistically significant at 0.01

This difference between the "field-based" and "book-based" groups in the risk management category is statistically significant at 0.01. Moreover, on a disaggregated level, three of six questions in this category show a statistically significant difference at 0.01. These questions inquire on the core material covered in the AIS class: a systematic approach to risk, the concepts of control, and identifying controls to mitigate risks. This finding suggests that the field component of the AIS project achieved its direct goal to support the mastering of the textbook material covered in the AIS class.

Another category where the perceived competencies are slightly higher (significance at 0.05 for two of seven questions, and for the overall index) is working with information ("data"). The students with field experience responded as more competent in working with data sources overall, but this difference becomes statistically significant only when it comes to the ability to work with different sources. The field experience of the AIS project includes at least two interviews with employees of the client organization and transforming this information into technical documentation about the business process. This experience may have improved students' perception of their competence in working with different data sources.

There is no difference between the two groups in the indices associated with decision-making, collaboration, project management, and communication. The first one is not surprising because the AIS project does not offer much decision-making skills development. The three soft skills, on the other hand, are important for successful completion of the AIS project. Although the field-based version of the project requires significant coordination and provides good lessons in teamwork and project management that the book-based project does not emphasize, these differences were not reflected in the survey measures. However, it should be noted that the AIS project is not the only opportunity for the students to develop these skills, with the data suggesting that students were able to successfully find ways to arrive at the same level of perceived collaboration, communication, and project management competencies with or without the field component of the AIS project.

In summary, Research Question 1 is answered positively for the categories of working with information and risk management. The field-based AIS project did positively affect students' perceptions of these professional competencies, but there were no statistical differences between the groups for the categories of decision-making, collaboration, communication, and project management.

Students' Appreciation of the AIS Class and Its Contribution to Competencies Development

Table 3 shows the mean for 42 measures that capture the contribution of seven different types of classes/activities (row values) to the six competencies (column values). Based on the underlying data of Table 3, I calculated for each of the two groups (field-based and book-based) the average for the six competencies (Table 6).

Table 6

Average Contribution of Each Activity for Developing Competencies

	Field-based			Book-based			t-test	
	N	Mean	Std. Dev.	N	Mean	Std. Dev.	t	2-sided p
Financial accounting	79	3.70	0.831	44	3.92	0.67	-1.459	0.147
Managerial accounting	79	3.68	0.793	44	3.77	0.737	-0.595	0.553
AIS	79	3.81	0.819	44	3.19	0.914	3.815	0.000**
General business classes	79	3.55	0.710	44	3.73	0.556	-1.407	0.162
Other classes in college	79	3.22	0.729	44	3.44	0.632	-1.661	0.099
Other classes elsewhere	79	2.63	0.846	44	2.74	0.856	-0.728	0.468
Personal experiences	79	3.73	1.00	43	3.63	0.920	0.533	0.595

*Statistically significant at 0.05 level
**Statistically significant at 0.01 level

A t-test shows that there are no differences between the two groups of students, except as related to the AIS class. This shows that offering students the field experience in the AIS class significantly changed the students' perception of the contribution of the AIS class to their overall professional development.

Table 7

Variables from Contributions Set with Statistically Significant Differences

	Field-based			Book-based			t-test	
	N	Mean	Std. dev.	N	Mean	Std. dev.	t	2-sided p
AIS for working with information	79	3.35	0.985	44	2.78	1.173	2.840	0.005**
AIS for risk management	79	4.20	0.868	44	3.52	1.151	3.695	0.001**
AIS for decision-making	79	3.41	1.113	44	2.90	1.184	2.369	0.019*
Other business classes for decision-making	79	3.39	0.986	44	3.75	0.879	-2.002	0.048*
AIS for collaboration	79	3.59	1.163	43	2.90	1.193	3.145	0.002**
Non-business classes for collaboration	78	3.63	0.918	43	4.03	0.782	-2.416	0.017*
AIS for project management	79	4.10	0.907	44	3.30	1.069	4.426	0.000**
AIS for teamwork	79	4.18	0.927	43	3.81	0.887	2.135	0.035*
Other business classes for teamwork	79	3.84	0.861	43	4.26	0.685	-2.759	0.007**
Non-business classes for teamwork	79	3.49	0.923	43	4.10	0.752	-3.756	0.000**

*Statistically significant at 0.05 level
**Statistically significant at 0.01 level

For a more granular view, I also ran pairwise comparisons for all contribution variables listed in Table 3. Table 7 includes those contribution variables with significant differences between students with and without field experience in AIS class. There are only ten such variables in the set of forty-two; six (all AIS-related variables) show higher appreciation for AIS class among students with field experience; the other four variables show higher appreciation of other classes among students with *no* field experience in AIS. This aligns with the earlier possible explanation regarding the lack of differences between the groups in students' self-assessment of their teamwork and collaboration skills. Previously, I stipulated that students who did not have an opportunity to practice these skills with field-based AIS project found those opportunities elsewhere. This analysis suggests that it could be attributed to these other classes.

Finally, I listed the average contribution levels from highest to lowest (Table 8) based on the classes/activities. The rankings illustrate the boost in appreciation of the AIS class from students completing the field-based AIS project. This field experience may also be a factor in making these students appreciate the contribution of their personal experiences to their learning.

Table 8
Rankings of Contribution Indices for Different Activities

Students who completed the field-based AIS project		Students who completed the book-based AIS project	
AIS	3.81	Financial accounting	3.92
Personal experiences	3.73	Managerial accounting	3.77
Financial accounting	3.70	General business classes	3.73
Managerial accounting	3.68	Personal experiences	3.63
General business classes	3.55	Other classes in college	3.44
Other classes in college	3.22	AIS	3.19
Other classes elsewhere	2.63	Other classes elsewhere	2.74

In summary, Research Question 2 is fully supported. Students who completed a field-based AIS project demonstrated a much higher appreciation for the AIS class and its role in development of their professional skills as compared to those who completed the book-based project.

Discussion

The study partially confirms the effect of the field component on students' perceptions of their professional competencies (RQ1). Students who worked with real organizations during their AIS class report significantly higher perceived risk management skills and slightly higher ability to work with information. This finding is especially important given that risk analysis was reported to be most difficult to master (Daigle et al., 2007). The field experience in the AIS project resulted in a better understanding of the concepts of control, a more systematic approach to risk, and a stronger ability to identify relevant controls.

Somewhat unexpectedly, students' self-assessed collaboration skills do not differ significantly between those who worked on the two different types of the AIS project. The data shows that students who did not have an opportunity to practice collaboration skills in an AIS class had other opportunities elsewhere, most often in other classes.

The data also provides strong evidence that the field component of the AIS project increases students' appreciation of the AIS class and its importance for their professional education (RQ2). Students and graduates often share that their AIS project field experience sparks interviewers' interest and helps them to secure internships and jobs.

This study was initially motivated by a desire to find a way to reduce students' workload in AIS class and fit in new technology-focused activities. The field component of the AIS project is very time and effort consuming; removing or replacing it with a less resource-consuming activity with similar learning outcomes would create more space in the curriculum. However, the results show that removal of the field component from the AIS project would significantly impact the perception of mastery of core AIS concepts related to risk analysis and control management. At the same time, the results show that taking away the opportunities to master soft skills (collaboration, teamwork, and project management) is not a concern; the students were able to gain these skills in other ways.

The results of this study suggest possible alternatives. Instead of removing the entire field component from the project, it may be possible to alter the project parts and/or add other, less time-consuming activities to the AIS class that would provide the lost opportunities to master the material. This is an area for further research.

Limitations

There are several limitations in the design of this study. One limitation is that the collected data is self-reported and perceptual, providing a subjective measure of students' beliefs about their abilities and not an objective measure of the actual abilities. Another limitation is that the sample is relatively small. Some of the mean values show a difference between the two groups, but these differences were not statistically significant due to the small sample size. Finally, the biggest caveat in comparing the two classes is that, although the classes had the same material except for the field component of the project, the two versions of the class were taught by different instructors. Both instructors are experienced accounting and AIS educators. Both worked for this school for several years, are well-known to the students, and have similarly high teaching evaluations. However, it is possible that the instructors' teaching styles influence students' learning outcomes and the attitudes toward the class.

References

AICPA. (1999). *The AICPA core competency framework for entry into the accounting profession.* Retrieved March 31, 2017, from https://www.aicpa.org/InterestAreas/AccountingEducation/Resources/Pages/CoreCompetency.aspx

AICPA. (2018). *The AICPA pre-certification core competency framework*. https://www.thiswaytocpa.com/collectedmedia/files/core-competency-framework.pdf

AICPA. (2022). *The AICPA pre-certification core competency framework*. https://www.thiswaytocpa.com/collectedmedia/files/career-services-and-accounting-partnerships-appx-k.pdf

Bolt-Lee, C., & Foster, S. D. (2003). The core competency framework: A new element in the continuing call for accounting education change in the United States. *Accounting Education*, *12*(1), 33–47. https://doi.org/10.1080/0963928031000074486

Brown, J. D. (2011). Likert items and scales of measurement. *Statistics*, *15*(1), 10–14.

Butler, M. G., Church, K. S., & Spencer, A. W. (2019). Do, reflect, think, apply: Experiential education in accounting. *Journal of Accounting Education*, *48*, 12–21. https://doi.org/10.1016/j.jaccedu.2019.05.001

Daff, L., de Lange, P., & Jackling, B. (2012). A comparison of generic skills and emotional intelligence in accounting education. *Issues in Accounting Education*, *27*(3), 627–645. https://doi.org/10.2308/iace-50145

Daigle, R. J., Hayes, D. C., & Hughes, K. E. (2007). Assessing student learning outcomes in the introductory accounting information systems course using the AICPA's core competency framework. *Journal of Information Systems*, *21*(1), 149–169. https://doi.org/10.2308/jis.2007.21.1.149

Fedorowicz, J., & Gray, J. M. (2021). The MSA is dead. Long live the MSA(A)! *Journal of Emerging Technologies in Accounting, 18*(2), 209–19. https://doi.org/10.2308/JETA-2020-034

Gallego, A.C., Donoso Anes, J. A., Duarte Atoche, T., Hernández Borreguero, J. H., & López Gavira, R. (2018). The effectiveness of the project-based learning (PrjBL) approach in undergraduate accounting education. *The Spanish Journal of Accounting, Finance and Management Education, 9*, 65–83. http://dx.doi.org/10.12795/EDUCADE.2018.i09.05

Gelinas, U. J., Dull, R. B., Wheeler, P., & Hill, M. C. (2018). *Bentley Team Project.* Cengage Learning.

Hoxmeier, J., & Lenk, M. M. (2003). Service-learning in information systems courses: Community projects that make a differences. *Journal of Information Systems Education*, *14*(1), 91–100. https://aisel.aisnet.org/jise/vol14/iss1/10

Jacoby, B. (1996). *Service-learning in higher education: Concepts and practices*. Jossey-Bass.

Kankaraš, M., & Capecchi, S. (2024). Neither agree nor disagree: Use and misuse of the neutral response category in Likert-type scales. *METRON*. https://doi.org/10.1007/s40300-024-00276-5

Lawson, R. A., Blocher, E. J., Brewer, P. C., Cokins, G., Sorensen, J. E., Stout, D. E., Sundem, G. L., Wolcott, S. K., & Wouters, M. J. F. (2014). Focusing accounting curricula on students' long-run careers: Recommendations for an integrated competency-based framework for accounting education. *Issues in Accounting Education*, *29*(2), 295–317. https://doi.org/10.2308/iace-50673

Norman, G. (2010). Likert scales, levels of measurement and the "laws" of statistics. *Advances in Health Sciences Education*, *15*(5), 625–632. https://doi.org/10.1007/s10459-010-9222-y

Oracle Fusion Applications Documentation. (n.d.). https://docs.oracle.com/cd/E29505_01/index.htm

Rebele, James E., & St. Pierre, E. K. (2019). A commentary on learning objectives for accounting education programs: The importance of soft skills and technical knowledge. *Journal of Accounting Education*, *48*, 71–79. https://doi.org/10.1016/j.jaccedu.2019.07.002

Rose, J. M., Rose, A. M., & Norman, C. S. (2005). A service-learning course in accounting information systems. *Journal of Information Systems*, *19*(2), 145–172. https://doi.org/10.2308/jis.2005.19.2.145

Roster, C. A., Lucianetti, L., & Albaum, G. (2015). Exploring slider vs. categorical response formats in web-based surveys. *Journal of Research Practice, 11*(1).

Appendix A

Business Process Analysis Project

Overview

In this project, your team will study and analyze a business process at a company or non-profit organization. Some examples of business processes are: order entry, billing, accounts receivable, purchasing, accounts payable, and cash disbursements. Your first task is to find a willing organization (your "client") and determine which process/system you will examine.

The general project timeline is as follows:

	Project step	Submission	Timing	% of grade*
	Find a client	Informal update	ASAP	
1	Work plan and interview plan	Project Proposal	Week 5	20
2	Interview the client Document the Business Process	Business Process Documentation	Week 9	30
	Mid-semester peer evaluation			
3	Control analysis and recommendations to the client: part 1	Presentation	Week 13—the last AIS class	20
4	Control analysis and recommendations to the client: part 2	Final Submission	Last day of semester	30
	Final peer evaluation			

*The final grade of each team member is adjusted based on the peer feedback.

Finding a Client

Additional details and tips for your client search will be provided in a separate document and discussed in class.

Project Proposal (Submission 1)

A proposal is a type of business document created to present an idea or work plan to stakeholders/decision-makers to obtain approval and/or funding. A proposal is a formal document. It should be properly formatted and written in formal, third-person language. A successful proposal convinces the reader that:

- Your proposed project is important: Introduce your client and show why the business process you are going to study is important for your client's success
- You know what you are doing, and have a plan: Show that you understand the goals and the details of the entire project and are ready to work as a team
- You have a general idea of the process you choose to study, understand who the key people are, and have secured interviews with them
- Your client will benefit from your work—explain how

A signed Client Agreement Form is due with the proposal.

Business Process Documentation (Submission 2)

The goal of documenting business processes is to develop an in-depth understanding of:

- The activities it includes, step-by-step,
- The flows of physical products,
- The ways information is collected, stored and processed, and
- The lifecycle of printed documents.

Read the project description in its entirety and make sure you understand the ultimate objective of the whole project. Think about questions for the interview that will help you later with control analysis. Schedule interviews with several people who are involved in different aspects of the process that you study.

The submitted document should include:

- A company overview (can be copy-pasted from the proposal, at least in part)
- Business process overview: the objectives of the process and their alignment with organizational goals; inputs and outputs; interactions with other processes
- The journal entries relevant to this business process

- Narrative: step-by-step description of the process activities
- Context diagram: the interactions of the process with other business processes and with external entities
- System flowchart of the process

The mid-semester peer evaluation (online survey) is required after Submission 2. Failure to submit valid peer feedback affects your individual grade for the project.

Presentation (Submission 3)

During the last class session, you will present your work to your colleagues (other teams). This is a great opportunity to get creative and to celebrate the end of semester and the great job you've done with the project. Also, prepare questions for other teams!

Internal Control Analysis and Recommendations (Final Submission)

This includes an executive summary of your work, a client company description, a revised process documentation, a control matrix with annotations, a control analysis, and managerial recommendations.

The final draft of your report, accompanied by a thank-you-letter, should be sent to your client. If you hear back from the client before the final submission, include the client's feedback in the deliverable. You can also report the client's informal feedback in your own words.

The final peer evaluation (online survey) is required after the final submission. Failure to submit valid peer feedback affects your individual grade for the project.

Appendix B

Survey Instrument

Working with Information

Please indicate the level of your agreement or disagreement with the following statements about your competencies in working with information. Scale: 1—strongly disagree, 3—somewhat disagree, 4—somewhat agree, 6—strongly agree

Please pay attention to the wording of questions. Some are stated as "competent" or "not competent," others as "confident" or "not confident."

1. I am *competent* at identifying and evaluating different sources of information, and reconciling conflicting or ambiguous data.
2. I am *not competent* in linking information, knowledge, and insights from different sources together for decision-making purposes.
3. I am *competent* at making analogies from problems I solved in the past to new problems not explicitly described.
4. I am *not competent* at learning from experiences outside the academic setting and at transferring knowledge from one situation to another.
5. I am *confident* in my ability to work with different sources and different types of information.
6. I am *not confident* in my ability to evaluate the reliability of a source of information.
7. I am *confident* in my ability to apply my skills and knowledge in new situations.

Please indicate how helpful the following activities were for developing your skills in working with information *(this question uses a sliding scale from 1 to 5 with increments of 0.5):*

_____ Financial accounting classes
_____ Managerial accounting and tax classes
_____ AIS class
_____ Other business classes
_____ Other classes at PC
_____ Other classes elsewhere (high school)
_____ Personal experiences (summer jobs, extra curriculums, etc.)
_____ Other [specify]

Risk and Control Analysis

Please indicate the level of your agreement or disagreement with the following statements about your risk and control analysis skills. Scale: 1—strongly disagree, 3—somewhat disagree, 4—somewhat agree, 6—strongly agree

Please pay attention to the wording of questions. Some are stated as "competent" or "not competent," others as "confident" or "not confident."

1. I am *competent* at identifying risks and analyzing possible negative outcomes.
2. I am *not competent* at identifying controls to mitigate these risks through prevention, detection, and correction.
3. I am *competent* at building appropriate models and technical documentation (such as spreadsheets and flowcharts) using appropriate software.
4. I am *not competent* at applying systematic approach to risk analysis and control evaluation.
5. I am *confident* in my risk analysis skills.
6. I am *not confident* in my understanding of the concept of control and my control evaluation skills.

Please indicate how helpful the following activities were for developing your risk and control analysis skills *(this question uses a sliding scale from 1 to 5 with increments of 0.5)*:

_____ Financial accounting classes
_____ Managerial accounting and tax classes
_____ AIS class
_____ Other business classes
_____ Other classes at PC
_____ Other classes elsewhere (high school)
_____ Personal experiences (summer jobs, extra curriculums, etc.)
_____ Other [specify]

Problem Solving and Decision-Making

Please indicate the level of your agreement or disagreement with the following statements about your competencies in problem solving and decision-making. Scale: 1—strongly disagree, 3—somewhat disagree, 4—somewhat agree, 6—strongly agree
Please pay attention to the wording of questions. Some are stated as "competent" or "not competent," others as "confident" or "not confident."

1. I am *competent* at considering contingencies, analyzing the impact of potential actions, and proposing and evaluating alternative solutions.
2. I am *not competent* at finding unconventional approaches and solutions to problems as circumstances dictate.
3. I am *competent* at knowing when to follow directions, question plans, or seek help.
4. I am *not competent* at reasoning carefully and thinking effectively in abstract terms or generalizations.
5. I am *competent* at managing stress, adapting to new contexts, and changing demands.
6. I am *not confident* in my ability to solve problems effectively and efficiently.
7. I am *confident* in my decision-making skills.
8. I am *not confident* in my ability to develop action plan and adjust it as circumstances dictate.

Please indicate how helpful the following activities were for developing your problem solving and decision-making skills *(this question uses a sliding scale from 1 to 5 with increments of 0.5)*:

_____ Financial accounting classes
_____ Managerial accounting and tax classes
_____ AIS class
_____ Other business classes
_____ Other classes at PC
_____ Other classes elsewhere (high school)
_____ Personal experiences (summer jobs, extra curriculums, etc.)
_____ Other [specify]

Communication and Collaboration

Please indicate the level of your agreement or disagreement with the following statements about your communication and collaboration skills. Scale: 1—strongly disagree, 3—somewhat disagree, 4—somewhat agree, 6—strongly agree
Please pay attention to the wording of questions. Some are stated as "competent" or "not competent," others as "confident" or "not confident."

1. I am *competent* at valuing inputs and points of view of others, and facilitating development of consensus or compromise.
2. I am *not competent* at accommodating to the protocols and expectations of a team, and committed to achievement of team's common goals.
3. I am *competent* at prioritizing and delegating, and in managing interdependencies when working as part of a team.
4. I am *not competent* at realistically estimating time and resource requirements and allocating project resources to maximize results.
5. I am *competent* at organizing and effectively displaying information so that it is meaningful to the receiving party.
6. I am *not confident* in my communication skills.
7. I am *confident* in my project management skills.

8. I am *not confident* in my ability to work in a team.

Please indicate how helpful the following activities were for developing your communication skills *(this question uses a sliding scale from 1 to 5 with increments of 0.5):*

    _____ Financial accounting classes
    _____ Managerial accounting and tax classes
    _____ AIS class
    _____ Other business classes
    _____ Other classes at PC
    _____ Other classes elsewhere (high school)
    _____ Personal experiences (summer jobs, extra curriculums, etc.)
    _____ Other [specify]

Please indicate how helpful the following activities were for developing your project management skills *(this question uses a sliding scale from 1 to 5 with increments of 0.5):*

    _____ Financial accounting classes
    _____ Managerial accounting and tax classes
    _____ AIS class
    _____ Other business classes
    _____ Other classes at PC
    _____ Other classes elsewhere (high school)
    _____ Personal experiences (summer jobs, extra curriculums, etc.)
    _____ Other [specify]

Please indicate how helpful the following activities were for developing your teamwork skills *(this question uses a sliding scale from 1 to 5 with increments of 0.5):*

    _____ Financial accounting classes
    _____ Managerial accounting and tax classes
    _____ AIS class
    _____ Other business classes
    _____ Other classes at PC
    _____ Other classes elsewhere (high school)
    _____ Personal experiences (summer jobs, extra curriculums, etc.)
    _____ Other [specify]

AIS Educator Journal Editorial Board 2023-2024

The AIS Educator Journal is published by the AIS Educator Association:
   President: William G. Heninger, Brigham Young University
   Vice President and President-elect: Gary P. Schneider, California State University, Monterey Bay
   Secretary: Sonia Gantman, Bentley University
   Treasurer: Kristian Mortenson, University of St. Thomas
   Past-President: Ronald J. Daigle, Sam Houston State University