Best Venue for Learning? A Comparison of Practitioners' and Educators' Preferences among Delivery Method Options for Developing AIS Proficiencies

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ABSTRACT

This study evaluates the differences in perception between practitioners and academicians regarding the topic material and learning venues for ten key accounting information systems (AIS) proficiencies. We received responses from 109 practitioners and 54 academics to the same content area questions. Although there was much agreement on the preferred training venue for some proficiency areas (basic computer and business skills), there was divergence in several areas. Academicians preferred traditional classroom training for virtually every proficiency area. In contrast, practitioners were much more likely to prefer corporate or outside training for advanced topics such as accounting software, reporting tools, and data exchange. This study contributes to the literature on AIS training by adding newer technologies to the list of proficiencies and by bringing current perceptions of practitioners regarding future needs into the discussion.

Keywords: Accounting Information Systems (AIS) Proficiencies, Teaching, Delivery Methods, Curriculum, Skills, Technology

INTRODUCTION

This study broadens previous investigations of the preference gap between practitioners and academics regarding instruction in accounting information systems (AIS) courses. The presence of this gap was detected as early as 1970 (Madden, 1970) and has continued to receive attention over the course of the intervening decades (Grumet, 2001; Gupta and Marshall, 2010; Krause, 2005; Marshall et al, 2010; Siegel et al, 2010; Wells et al, 2009; Winstead and Wenger, 2015). Unlike most subfields in accounting, the composition of AIS courses may vary widely.

The present study contributes to the literature by exploring which delivery methods practitioners and academics choose as optimal for instruction in ten key AIS topic areas. Measuring the levels of AIS proficiencies recommended by academics and CPAs offers insights into selection of course content that can benefit all stakeholders (students, programs, profession, and prospective employees).

PREVIOUS RESEARCH

A number of studies have examined various delivery methods for accounting instruction, including related accounting systems and technology. Russ et al (2010) surveyed career and technical educators. They concluded that educators are willing to teach distance learning courses regardless of demographic characteristic and that students possessing self-motivation and computer literacy, who work with no interruptions, are more successful. Chen et al (2012) surveyed beginning and advanced students to examine the effectiveness of delivery method relative to level of the course. Their results suggest course level is significant when assessing whether offering online courses are appropriate for a given level. Delivery mode was not important for principles courses, but outcomes in advanced courses were significantly more favorable for traditional classroom environments than for online. They also report a preference for blended learning over a predominately online course and that course level may be important in deciding the mix of face-to-face versus online. Adebayo and McGrath (2013) recounted their school's efforts to reform its pedagogy and curriculum for technology courses to align them with the needs of today's dynamic business environment. Garman (2015) reported that a student's GPA was the most important predictor for final course average in a beginning database course. Reading score was a highly significant differentiator for online students, but not for students in a traditional classroom. Grossman and Johnson (2015) studied employers' attitudes toward graduates of traditional or hybrid accounting programs versus those of online accounting programs. Their experimental results showed employers are significantly more willing to hire entry-level job applicants from AACSB-accredited institution offering a traditional (or hybrid) environment. Furthermore, their survey results reported employers had a greater acceptance of online lower-level accounting coursework (versus online upper-level courses). They also reported acceptance of students completing either bachelors or master's degrees online over

those completing both online as well as a greater acceptance of some online accounting coursework. Chiu et al (2015) studied principles of accounting students to examine student performance, satisfaction, and perceived course effectiveness among students in traditional classrooms and those viewing pre-recorded online lectures. Their results found no significant differences in students' grades among delivery method. They reported that a student's prior GPA and interest were the most important factors in determining final course grade. In addition, they found some evidence of greater student satisfaction and perceived effectiveness in a traditional course setting.

RESEARCH DESIGN

To maintain fundamental skills as well as cope with technology-driven changes, the current study employed ten AIS proficiencies. Following method employed in a recent study (Winstead and Wenger, 2015), survey participants offered assessments of preferred delivery methods for developing proficiency the following nine areas, organized into three broader categories. In addition, proficiency in office productivity software was added to this study:

Operational Systems Proficiencies
Navigate computer's operating system/minor troubleshooting.
Understand business cycles in an electronic environment.
Navigate a major accounting software package to accomplish basic accounting tasks.

Reporting and Data-Sharing Proficiencies
Using accounting software package to create reports.
Understand data-sharing technologies commonly used with business partners.
Use XBRL to meet financial statement reporting requirements.

Organizational Systems Proficiencies
Ability to comprehend business needs and envision how technology could solve ongoing business problems.
Understand basics of e-commerce, including the implications on accounting when using outsourced web services.
Basics of safeguarding electronic accounting records, including backup media, network security, and disaster recovery.

Office Productivity Software Proficiencies

In addition to the hypothesis associated with Office Productivity Software, hypotheses were organized around these three categories: operational systems proficiencies, reporting/data sharing proficiencies, organizational systems proficiencies. Prior studies have addressed the capability to simply operate a computer (operational systems proficiencies), including transaction processing. Different forms of reporting and data sharing technologies have consistently appeared in these studies as well. Lastly, organizational systems proficiencies have become more important—Stocks and Romney (1987) found that accountants in industry favor the "innovation" trait (the "problem solver" role) and many studies since have noted increased interest in safekeeping records and e-commerce topics.

Hypothesis Development

Each hypothesis considers whether accounting academics and practitioners agree on which delivery method is most appropriate for each of the key AIS topic areas. The first supporting hypothesis addresses whether the prospective accountant can functionally operate a computer. "Operating a computer" includes the ability to navigate an operating system, fix minor problems, and navigate an accounting system to accomplish basic accounting tasks. Participants were offered four delivery method alternatives: undergraduate class, graduate class, self-study, and employer-sponsored training.

Hypothesis 1*: There is a difference in the perceptions of the preferred delivery method for obtaining operational systems proficiencies needed by accounting graduates entering the marketplace held by accounting academics and those held by CPAs.*

In the area of "reporting and data-sharing proficiencies", we asked participants to assess the most appropriate delivery method for instruction in creating reports in an accounting software package and reporting in XBRL. In addition, participants were to consider other advanced output technology, such as data-sharing using EDI or similar technologies. Participants were offered the same four delivery method alternatives presented in the first hypothesis. Together, these three topics form the second hypothesis.

Hypothesis 2: *There is a difference in the perceptions of the preferred delivery method for obtaining reporting and data sharing proficiencies needed by accounting graduates entering the marketplace held by accounting academics and those held by CPAs.*

While the first two hypotheses address individual effectiveness using the technology, the third hypothesis addressed issues effecting businesses more broadly. Organizational systems proficiencies include ability to leverage technology in problem-solving, attaining a comfort level with issues surrounding having an online business presence, and protecting data. Participants were offered the same four delivery method alternatives presented in the first hypothesis. Together, these three topics form the third hypothesis.

Hypothesis 3*: There is a difference in the perceptions of the preferred delivery method for obtaining organizational systems proficiencies needed by accounting graduates entering the marketplace held by accounting academics and those held by CPAs.*

Most educators agree that graduates of accounting programs should enter the marketplace with well-developed skills in using office productivity software, such as word-processing, spreadsheet, and database software. This is the focus of the fourth hypothesis.

Hypothesis 4: *There is a difference in the perceptions of the preferred delivery method for obtaining office-productivity software proficiencies needed by accounting graduates entering the marketplace held by accounting academics and those held by CPAs.*

Six delivery methods were presented for the tenth AIS topic, office productivity software: high school class, undergraduate AIS class, other (non-AIS) undergraduate class, graduate AIS class, self-study, and IT (information technology) training center. Some U.S. high schools offer a course in office productivity software, including a pathway to certification as "power user". In addition, some universities may not include office productivity in their curricula, instead relying on students to develop those skills independently or for employers to sponsor training at a for-profit training center.

Survey Instrument

For topics within the supporting hypotheses, delivery methods with few (less than 5) observations are collapsed into a single category with observations of a similar method, to meet requirements of Chi-square statistical tests.

Participants answered questions about the desired level of proficiency. They chose from a six-point Likert scale on levels of proficiency ranging from "No" Proficiency to "High" Proficiency, similar to the four-point Likert scale of emphasis (Heavy, Medium, Light, None) employed in earlier work (Heagy 1987). Response rates differed by group, with CPAs responding to the survey at a much lower rate than academics (Table 1). One reason for this discrepancy could be greater reliability of academic contact information vs. that of practitioners, who may change positions more frequently. Another reason may be that academics, understanding the nature of academic research, may be more inclined to support fellow researchers by responding to surveys such as this one.

Data Collection

The survey was conducted using an online survey hosting website. A list of accounting professors with a systems interest was identified using Hasselback's Accounting Faculty Directory (2015). The list of CPAs was obtained by purchasing an address list from a marketing firm. In all, the list of academics totaled 969 and the list of certified public accountants (hereafter, simply "CPAs") obtained from the marketing firms totaled 17,105.

Survey respondents represent a variety of accounting specializations and experience. Considering the disparity in the number of respondents among the groups and lack of evidence to support the normality assumption, nonparametric Mann-Whitney U-value test was applied to analyze the data collected in this study. The Mann-Whitney U test is a nonparametric counterpart of the t test used to compare the means of two independent populations. The other assumption is that the level of data is at least ordinal (Black 2001, 692). Data collected in the study fit these criteria.

Table 1: Demographic Information		
	Practitioners	Academics
Highest Degree Attained		
Bachelor's Degree	73	
Master's Degree	33	6
Doctorate Degree	1	46
Other (Associate's Degree or "Some" College)	2	
No Response		2
Number of Respondents	109	54
Certifications		
Certified Public Accountants	95	46
Other Certifications (CMA, CFE, etc.)	3	2
No Certifications	10	6
Number of Respondents	109	54
Place of Business		
Public Accounting	103	
Industry	3	
Other	3	
Education		54
Number of Respondents	109	54

Data Analysis

In the first topic in Table 2 below, for example, no academic and only one practitioner indicated that new accountants should learn about navigating the operating systems and solving minor troubleshooting in graduate school class. In this case, the "undergraduate class" and "graduate class" response cells were collapsed into a "college classroom" category. This treatment is consistent with Davis and Leitch's (1988, pp. 163-164) recommended topics for prerequisite and/or the first (undergraduate) AIS courses. Similarly, only one academic indicated that the second topic should be studied after college and, therefore, the "self-study" and "employer-sponsored training" responses cells were collapsed into a "outside source" category. Despite these efforts, a number of cells still contained fewer than the prescribed minimum of 5 per cell. To support chi-square testing, the Freeman-Halton extension (1951) of Fisher's Exact Test was computed, resulting in significance levels similar to chi-square test.

Hypothesis 1 tests whether accounting academics and practitioners agree on the level of AIS proficiencies they would recommend to accounting graduates entering the marketplace. The first of three supporting Hypothesis 1 addresses an accountant basic operational skill set, including the ability to navigate an operating system, fix minor problems, understand business cycles (such as revenue cycle, expense cycle, etc.) in an electronic environment, and accomplish basic accounting tasks in a modern accounting software package.

Table 2: Recommended Delivery Methods for *Operational Systems Proficiencies*				
AIS Topics: Operational Systems Proficiencies	Observed-Practitioners: Count(Mean)	Observed-Academics: Count(Mean)	X^2	X^2 Sig. (Fisher's Exact Sig.)
Navigate computer's operating system/minor troubleshooting:				
College Classroom (Undergraduate or Graduate)	63 (57.8%)	29 (53.7%)	2.99	0.224 (0.228)
Self-Study	22 (20.2%)	17 (31.5%)		
Employer-Sponsored Training	24 (22.0%)	8 (14.8%)		
Understand business cycles in an electronic environment:				
Undergraduate Class	80 (73.4%)	49 (90.7%)	8.03	0.018* (0.012*)
Graduate Class	12 (11.0%)	4 (7.4%)		
Outside Source (Employer-Sponsored Training or Self-Study)	17 (15.6%)	1 (1.9%)		
Navigate a major accounting software package to accomplish basic accounting tasks				
College Classroom (Undergraduate or Graduate)	42 (38.5%)	34 (63.0%)	9.08	0.011* (0.009*)
Self-Study	9 (8.3%)	4 (7.4%)		
Employer-Sponsored Training	58 (53.2%)	16 (29.6%)		
*= Significant at the 0.05 (one-tailed) level.				

The Freeman-Halton extension (Freeman and Halton, 1951) supports 2 x 3, 2 x 4, and 3 x 3 designs in addition to the sample cell size problems addressed by Fisher's Exact Test for 2 x 2 designs. The Freeman-Halton extension also has limitations, including no cells containing values less than 1 (no zeroes) and total sample size (N) must be less than or equal to 320 for 2 x 3 designs and 120 for 2 x 4 designs. As a result, response data could only be analyzed in collapsed form (2 x 3) and Freeman-Halton was not used in analyzing the last hypothesis regarding office productivity proficiency.

As for the three hypotheses related to operational systems proficiencies presented in Table 2, analysis of responses indicates agreement between practitioners and academics on the first topic, navigating the operating system ($p = 0.224$, fail to reject the null). Responses for the second topic (understanding business cycles) and third topic (navigating a major accounting software package), however, indicate disagreement ($p = 0.018$ and 0.011, respectively). Therefore, we reject the second and third supporting null hypotheses in the area of operational systems proficiencies; support for rejecting supporting null Hypothesis 2 is inconclusive.

Table 3 below reports the survey results concerning reporting and data-sharing proficiencies. The second set of three topics supporting Hypothesis 2 addresses how new accountants gain proficiencies in using reporting and data-sharing technologies (as described previously).

Davis and Leitch (1988) recommended studying "Statements and Reports" in prerequisite or first AIS classes and "Communication Systems" and "Local-Area Networks" (conceptually similar to modern data-sharing) in first or other AIS classes. XBRL did not exist at the time of the Davis and Leitch study, but some XBRL textbooks are aimed at senior-level accounting students and workshop participants (White, 2009, p. vii), suggesting that XBRL is an advanced topic. Analysis of these response indicate support for rejecting the supporting null hypotheses in this area ($p = 0.014$, less than 0.000, and 0.008, for chi-square tests, respectively). Academics and practitioners clearly differ on conveyance of these proficiencies, with academics primarily favoring classroom instruction and large numbers of practitioners favoring training from outside sources (self-study and sponsored training) as an alternative to traditional classroom training. Overall, responses to preferred delivery methods in this area support rejecting the null Hypothesis 2—practitioners' responses differ from those of academics with respect to the preferred methods of delivering reporting and data-sharing proficiencies.

Table 3: Recommended Delivery Methods of *Reporting and Data-Sharing Proficiencies*				
AIS Topics: Reporting and Data Sharing Proficiencies	Observed-Practitioners: Count(Mean)	Observed-Academics: Count(Mean)	X^2	X^2 Sig. (Fisher's Exact Sig.)
Using accounting software package to create reports.				
College Classroom (Undergraduate or Graduate)	50 (45.9%)	37 (68.5%)	8.58	0.014* (0.010*)
Self-Study	7 (6.4%)	4 (7.4%)		
Employer-Sponsored Training	52 (47.7%)	13 (24.1%)		
Understand data-sharing technologies commonly used with business partners.				
Undergraduate class	33 (30.3%)	33 (61.1%)	30.51	< 0.000* (3.073)
Graduate class	17 (15.6%)	16 (29.6%)		
Outside Source (Employer-Sponsored Training or Self-Study)	59 (54.1%)	5 (9.3%)		
Use XBRL to meet financial statement reporting requirements.				
Undergraduate class	37 (34.0%)	25 (46.3%)	9.70	0.008* (0.006*)
Graduate class	25 (22.9%)	19 (35.2%)		
Outside Source (Employer-Sponsored Training or Self-Study)	47 (43.1%)	10 (18.5%)		
*= Significant at the 0.05 (one-tailed) level.				

Table 4 below reports the survey results concerning organizational systems proficiencies. Hypothesis 3 addresses how new accountants gain systems proficiencies benefitting the organization at large (as described previously).

Table 4: Recommended Delivery Methods of *Organizational Systems Proficiencies*				
AIS Topics: Organizational Systems Proficiencies	Observed-Practitioners: Count(Mean)	Observed-Academics: Count(Mean)	X^2	X^2 Sig. (Fisher's Exact Sig.)
Ability to comprehend business needs and envision how technology could solve ongoing business problems.				
Undergraduate class	40 (36.7%)	29 (53.7%)	11.31	0.004* (0.002*)
Graduate class	39 (35.8%)	22 (40.7%)		
Outside Source (Employer-Sponsored Training or Self-Study)	30 (27.5%)	3 (5.6%)		
Understand basics of e-commerce, including the implications on accounting when using outsourced web services.				
Undergraduate class	52 (47.7%)	34 (63.0%)	12.87	0.002* (0.001*)
Graduate class	24 (22.0%)	17 (31.4%)		
Outside Source (Employer-Sponsored Training or Self-Study)	33 (30.3%)	3 (5.6%)		
Basics of safeguarding electronic accounting records, including backup media, network security, and disaster recovery.				
Undergraduate class	58 (53.2%)	41 (75.9%)	18.33	< 0.000* (< 0.000*)
Graduate class	11 (10.1%)	10 (18.5%)		
Outside Source (Employer-Sponsored Training or Self-Study)	40 (36.7%)	3 (5.6%)		
*= Significant at the 0.05 (one-tailed) level.				

Davis and Leitch (1988, pp. 163-164) recommended "Program Design" and "Systems Design and Analysis" topics for the first and other AIS courses. Exposure to these topics extends students'

understanding from "how-to" accomplish a task using technology to "how does the system work" and "where else this can be applied". Certainly, the "accountant as problem-solver meme' discussed in an earlier section continues through this "envision" topic and is well-suited for the first (undergraduate) or other (graduate-level) AIS course. Davis and Leitch (1988, pp. 163-164) recommended "Security and Backup" at the prerequisite course as well as the first and other AIS courses. E-commerce and web services were not in widespread use at the time of the Davis and Leitch study, but such advanced topics are likely better suited for graduate-level courses.

Analysis of these responses indicate support for rejecting the supporting null hypotheses in this area (p = 0.004, 0.002, and less than 0.000, for chi-square tests, respectively).

Delivery methods for obtaining proficiency in this area include high school classes, undergraduate courses (AIS and others), graduate courses, for-profit IT training centers, and self-study. Davis and Leitch (1988, pp. 163-164) recommended "Spreadsheets" and "Word Processing" as topics for prerequisite courses, not the first or other AIS courses. Due to only one practitioner indicating a preference for a graduate course in this instance, this response was included with the undergraduate AIS course observations. With the restrictions of the Freeman-Halton extension of the Fisher Exact Test for 2 x 4 designs ($N \leq 120$), no other cells were merged together and chi -square testing was conducted to this 2 x 5 design.

Table 5: Recommended Delivery Methods of *Proficiency in Office Productivity Software*

AIS Topics: Office Productivity Software	Observed-Practitioners	Observed-Academics	X^2	Significance
High School class	35	5	17.55	0.001*
Undergraduate/Graduate AIS class	44	20		
Other Undergraduate class	22	26		
Self-study	6	1		
IT Training Center	2	2		
*= Significant at the 0.05 (one-tailed) level.				

Analysis of these responses indicate support for rejecting the supporting null hypothesis for this topic (p = 0.001, for chi-square test). A large number of practitioners favored a High School class for delivery of office productivity proficiencies, while academics preferred undergraduate classes. Overall, responses to preferred delivery methods in this area support rejecting the null Hypothesis 2—practitioners' responses differ from those of academics with respect to the preferred methods of delivering office productivity software proficiencies.

DISCUSSION

The results of this study reinforce how AIS, unlike many other courses in accounting curricula, elicit a broad range of responses regarding topic areas and expectations for learning environments and prerequisites. Practitioners and academicians largely agree that basic computer skills should be learned prior to taking an AIS course/joining the profession; in fact, many practitioners expect such training to occur at the high school level. Both groups largely agree that an understanding of business cycles and how technology has an impact on them is best developed in the classroom at the undergraduate level. When it comes to more advanced skills, such as accounting software packages, data sharing and integration, and reporting requirements such as XBRL, practitioners are much more likely to expect training to take place on the job or through an outside source rather than in the classroom.

This research updates the discussion on AIS curricula by incorporating new technologies (i.e., XBRL) and changing practitioner needs. As the ability of software and related technologies continues to automate increasingly complex tasks, accountants' skill sets must adjust accordingly. The current emphasis firms have placed on data analytics in audit and tax practices is but one example. As with all such research, there may be limitations to the generalizability of this research based on the nature of the respondents and how well they reflect the general population of practitioners. As the pace of technology change increases, it is important to maintain a dialog between the profession and academia regarding the "what" and "how" of teaching and learning AIS concepts.

CONCLUSIONS

Overall, with the exception of the first topic, rejection of the other nine supporting hypotheses indicate evidence to support rejection of the null Hypothesis 2—there is evidence to suggest a statistically significant difference in the perceptions of the preferred delivery method for obtaining AIS proficiencies needed by accounting graduates entering the marketplace held by accounting academics and those held by CPAs.

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