

The Curricular Content of Accounting Information Systems

Kenneth M. Macur; (E-mail: macurk@mail.uww.edu), University of Wisconsin-Whitewater

Abstract

This paper presents the results of a descriptive study of the current content of the undergraduate accounting information systems (AIS) course. A request for a copy of the course syllabus for the undergraduate AIS course was sent to two hundred schools. The results are summarized in two ways. First, the stated objectives of the course are categorized according to emphasis of the topical areas suggested by the AAA Committee on Contemporary Approaches to Teaching Accounting Information Systems [1987] and the AICPA's Information Technology in the Accounting Curriculum [1997]. Second, syllabi are analyzed for projects assigned and software utilized; based on the AICPA's, basic pre-qualification skills for users of information technology.

Introduction

Applying computer technology is simply finding the right wrench to pound in the correct screw.
--Anonymous

Defining the curricular content of accounting information systems has been a challenging task ever since the introduction of computers in business education. Many authors (Heagy [1988], Romney [1996]) have described AIS as a "problem" course because of the lack of instructor consensus regarding its composition. O'Leary, et al [1996] found a "highly diversified" AIS curriculum. And Walton [1997] also noted "the lack of standardization in topical coverage across accounting programs." Similarly, anecdotal evidence with textbook publishers and a review of texts' tables of contents (see Appendix) confirms the lack of market uniformity.

The purpose of this paper is to present

Readers with comments or questions are encouraged to contact the authors via e-mail.

the results of a descriptive study of the current content of the undergraduate accounting information systems (AIS) course. The purpose of the research is: (1) To describe the curricular content of AIS as suggested by relevant professional groups; (2) To determine the level of consistency that exists between AIS classes and professional guidelines; (3) To determine the level of consistency that exists between AIS classes across the country; and (4) To gather and disseminate creative approaches and components of AIS courses across the country.

Literature Review--What to Teach

It has become appallingly obvious that our technology has exceeded our humanity.
--Albert Einstein

The purpose of this section is to describe a normative position on the content of AIS; i.e., what *should be* taught, from the perspectives of professional academics--the American Accounting Association; professional ac-

counting--the American Institute of CPAs; and the current practices of other employers.

It has been over ten years since the AAA Committee on Contemporary Approaches to Teaching Accounting Information Systems [1987] described its recommendations for the curricular objectives of the AIS. In their report, the AAA Committee identified nine broad categories of topics and suggested levels of coverage for the AIS course. The categories and the suggested levels of coverage are:

	Level of coverage	Content categories
1	Knowledge of	Auditing of accounting information systems
2	Comprehension of	Management's use of information
3	Comprehension of	Management of information systems
4	Application of	Use of systems technology
5	Application of	AIS applications
6	Application of	Systems analysis and design
7	Analysis of	Technology of information systems
8	Analysis of	Database concepts
9	Analysis of	Internal control

In 1997, the AICPA¹ [1997] "updated" these recommendations by adopting guidelines from the Education Committee of the International Federation of Accountants (IFAC) for "Information Technology Competencies in the Accounting Curriculum." IFAC outlined guidelines for the theoretical and practical content of user oriented education requirements, as well as a set of role related education requirements associated with the manager, designer, and evaluator roles. They assumed that, "at the time of qualification, all professional accountants will operate in at least two roles: the user role and one of the other three roles, depending on the member's work domain." (¶19)

The guidelines presented the following topics in their general education requirements, applicable to all accountants: (1) Information technology concepts for business systems, (2) Internal control in computer based business systems, (3) Development standards and practices for business systems, (4) Management of IT adoption, implementation, and use (5) Evaluation of computer based systems. (¶40)

The IFAC committee added the following emphasis: "Of particular importance to all professional accountants, regardless of their specific domain of professional activity, is the issue of internal control." (¶42)

IFAC made the following recommendation for the *theoretical* content of user oriented education:

"Professional accountants, as users of IT, must have the background knowledge and familiarity with information systems concepts and terminology that would enable them to make reasonable decisions in connection with simple systems such as defining their needs, identifying alternatives, deciding whether to acquire a pre-packaged system or develop the system using end user tools such as spreadsheet packages or database packages, or out source the development to another branch of the organization or an outside consultant, and selecting the appropriate hardware, software, and supplier." (¶54)

Continuing, IFAC made the following recommendation for the *practical* content of the curriculum for users of information technologies:

“...there are certain fundamental skills that are widely regarded as the minimum set of skills that all professional accountants must have prior to qualification: (1) ability to use a word processing package, (2) ability to use a spreadsheet package, (3) ability to use a database package, and (4) ability to use at least one basic accounting package.” (¶58)

IFAC suggests that a single post-secondary course comprised of 40 in-class hours and 80 out-of-class hours could address these topics satisfactorily. (¶45)

Obviously, the IFAC guidelines have not been available long enough for instructors to respond. However, comparing these suggestions would tell us what holes might be left to fill; whereas, comparing current syllabi to the AAA Committee's recommendations would indicate how responsive accounting programs and instructors of AIS have been in following those guidelines.

Lastly, Davis [1997] surveyed employers, asking the question “What computer skills do employers expect from recent college graduates?” The study is only slightly applicable here because there is agreement that computer skills are only one part of an understanding of information systems. Also, Davis' respondents were asked about college graduates in general, and not accounting graduates. Davis found that 56% of employers expected intermediate or advanced word processing skills. 25% of employers had expectations that college graduates would have intermediate or advanced abilities to create or modify programs or macros. Over one third needed intermediate or advanced database skills, while close to fifty percent expected intermediate to advanced spreadsheet skills. In a related issue, Prawitt, et al [1997] surveyed over 4,000 members of the AICPA concerning the software that they use. The results give good guidance for faculty contemplating choice of software based on commercial/professional popularity.

Literature Review-Studies of AIS Curriculum

Progress is man's ability to complicate simplicity.
-Thor Heyerdahl

There are many factors that can contribute to a lack of consensus. While one could infer (or hope) that the content of the course would settle into some consensus based on the direction by the AAA, this has not been the case. Instructors and authors readily recognize that the AAA Committee's recommendations represent more material than could be covered in a single one-semester course. Thus, instructors are required to select from the AAA Committee's list. Also, some “AIS” topics might be covered in other courses. For example, AIS applications such as traditional transaction cycles could be covered in the Accounting Principles course or in Intermediate Accounting, through the use of a practice set. Similarly, internal control could be covered in the Auditing course. The use of technology (e.g., spreadsheets) could be pervasive throughout the accounting curriculum, thereby negating the need for specific coverage in AIS.

In their recommendations, the AAA Committee conceded the possibility of variety by noting that:

“There are many ways to support the educational objectives of an accounting information systems course, some more efficient and effective than others. Selecting the right tools requires a thorough understanding of the available resources and familiarity with the characteristics of specific ones gained through use and experimentation. In the final analysis, the teaching tools used reflect the orientation of the instructor.” (p. 144)

Because “the teaching tools used reflect the orientation of the instructor” and because there is more than one course-worth of material in the AAA recommendations and the Davis and Heagy studies, instructors in a single AIS course usually have a lot of discretion in terms of the material covered and the tools used.

A complicating factor that could contribute to the lack of curricular consensus is “the orientation of the instructor.” Calderon, et al [1996] reported that 44.3% of their respondents were self-taught in the area of accounting information systems. 26.2% of faculty respondents had “some” to “very little” course work. The source of information for someone who is self-taught or has had very little formal training is a critical question. Possibly, instructors with little or no training could develop a course based on a text and its supplements. However, that text is developed by authors who are trying to determine what instructors are looking for in a text and supplements, thereby leading to a “chicken and egg” paradox.

Rapidly changing technologies and limited budgets present special challenges to maintaining an up-to-date curriculum. Compared to traditional financial accounting, AIS is relatively young and new technologies will cause this to perpetuate. Changing technologies and the resources available (or unavailable) contribute to curricular diversity. A unique attribute of the AIS course is that it can be taught with a lab format similar to a physical science class. Lab experiments come in numerous shapes and sizes. Many instructors have adopted innovative components, such as using commercial general ledger software practice sets (Pillsbury [1996]), spreadsheet case studies in information systems analysis and design (Maher [1993]), and relational database cases (Maher [1993] and Davis [1997]) that should be shared.

Walton [1997] studied the difference in coverage as a function of school size and curricular prerequisites. She found that most schools (81 out of 88) that require no information systems course or only an introduction to information systems were not accredited by the AACSB. Further, she found that only 50% of respondent schools required a specific AIS course for accounting majors. Walton did not report any statistically significant differences in prerequisite course coverages when schools did or did not require an AIS course. The second part of her study was to determine what differences existed in the AIS coverage for schools where there was an MIS prerequisite vs. schools where there was no MIS prerequisite. She reported the following results:

Topic	Mean number of class hours		
	Total	MIS Prereq	No MIS Prereq
System development life cycle	4.19	4.02	4.31
Data management	1.08	1.07	1.09
Data communication	1.03	.84	1.16
Database management systems	1.35	1.39	1.32
Decision support systems and expert systems	.69	.62	.73
Practice set	.36	.57	.22
Spreadsheet applications	1.85	1.75	1.91
Database applications	1.12	.73	1.39
General ledger packages	2.31	3.07	1.79
Other software	.39	.35	.41
Projects	.58	.51	.62
Student presentations	.85	1.28	.55

None of the differences between MIS as a prerequisite and no MIS prerequisite were reported as statistically significant.²

O’Leary, et al [1996] surveyed 59 schools “to investigate the nature of the accounting information systems course.” The authors compiled 59 syllabi which are available for Internet viewing and

downloading. They performed little analysis of the results.

Research Design

Any sufficiently advanced technology is indistinguishable from magic.

--Arthur C. Clarke

For the current research, a request was sent to two hundred schools, selected at random, that were listed in the 1997 faculty directory of AAA member schools. The request was for a copy of the course syllabus for the AIS course. First requests were mailed in September of 1997. Second requests were mailed in November, 1997. The requests had the following success.

	Number		
Total number of requests sent	200		
Total number of responses	86	43.00%	of the total sent
Responses indicating no AIS course	26	30.23%	of the responses
Responses indicating one AIS course	59	68.6%	of the responses
Responses indicating two AIS courses	1	1.16%	of the responses
Usable Responses	56	65.12%	of the responses

The first observation is a positive trend in the number of schools offering an AIS course. That is, in Walton's 1993 study, 50% of schools surveyed did not have an AIS course. Here, close to 70% of responding schools offer such a course.

Data Evaluation

Experience is a wonderful thing. It enables you to recognize a mistake every time you repeat it.

--Anonymous

Analysis of Syllabi--Textbook Selection

Unlike other accounting textbook markets, the AIS market has no dominant performer. The following textbooks were used:

Author(s)	Frequency
James Boockholdt	6
Ulric J. Gelinias, Steve G. Sutton, and Allan E. Oram	8
James A. Hall	6
Anita Hollander, Eric Denna, and Jay Owen Cherrington	5
Stephen Moscove, Mark Simkin, and Nancy Bagranoff	7
Marshall Romney, Paul Steinbart, and Barry Cushing	10
Joseph W. Wilkenson and Michael J. Cerullo	5
Other AIS	2
None or other non-AIS (e.g., software reference manual)	8

This result is similar to previous studies. As one publisher commented, AIS is an easy market to enter and a tough market to dominate.

The first step of analysis was to compare topics assigned from each of the returned syllabi to the AAA Committee categories.

Content categories	# of Syllabi Indicating Some Coverage	% of Usable Responses	Avg # of Bi-Weekly Classes
AIS applications	51	91.07%	7.61
Internal control	46	82.14%	3.84
Use of systems technology	45	80.36%	5.55
Database concepts	40	71.43%	3.20
Systems analysis and design	34	60.71%	4.28
Technology of information systems	31	55.36%	2.87
Management's use of information	28	50.00%	2.89
Auditing of AIS	14	25.00%	2.21
Management of information systems	8	14.29%	2.14
Total number of responses	56		

These results seem to indicate a higher degree of consensus than has been previously reported. That is, syllabi from more than fifty percent of respondent addressed seven of the nine topics suggested by the AAA committee.

The next table identifies how many categories each syllabi addressed. As you can see, on average, respondents covered over five of the nine categories.

Number of syllabi that addressed:	
1 category only	0
2 categories	2
3 categories	6
4 categories	8
5 categories	10
6 categories	15
7 categories	9
8 categories	2
9 categories	1
Total	53 ³
Average	5.3

Analysis of Syllabi--Project Coverage

The next analysis examined the nature of projects assigned. Using the IFAC guidelines, and assuming that word processing is not a software used for information systems, the following results were noted (for the 56 usable responses):

	Number	% of Usable	% of Grade	Software
G/L Software Project	24	42.86%	19.64%	Peachtree (5), Great Plains (3), QuickBooks (3)
Systems Understanding Aid	18	32.14%	16.44%	Micro SUA (4)
Spreadsheet Project	17	30.36%	15.785	Excel (13/18)
Database Project	17	30.36%	16.93%	Access (15/17)
Other Projects ¹	49	87.50%	22.43%	
Textbook Exams/Quizzes	55	98.21%	59.36%	

While there is an overwhelming majority (98.21%) of classes that used traditional exams and quizzes as the primary basis for student evaluation, the percent of the total grade seems low (58.44%).

The following table shows the mix and preference of projects employed by AIS instructors:

Number of syllabi with	Total	Percent
No (G/L software, SUA, spreadsheet, or database) project	8	14.29%
One project		
G/L software (9), SUA (7), Spreadsheet (4), Database (6)	26	46.43%
Two projects		
G/L and SUA (5), and Spreadsheet (4), and Database (2)	18	32.14%
SUA and Spreadsheet (2), and Database (1)		
Spreadsheet and Database (4)		
Three projects		
G/L, Spreadsheet, and Database (1)	2	3.57%
G/L, SUA, and Database (1)		
Four projects	2	3.57%
Total	56	


Conclusion

Significant effort has been expended to gather information about different approaches to teaching AIS. Absent from all of these is any kind of definition of agreement or consensus. In the present study, over 90% of respondents cover AIS applications. Over 85% of the current survey's respondents incorporate at least one project using software recommended by IFAC and the AICPA. Over 80% of the current survey's respondents addressed internal control. Over 70% discuss and/or apply database concepts. And over 60% discuss and/or apply systems analysis and design. It appears that in general, AIS is moving to consensus, while maintaining a level of individuality.

The argument could be made that AIS includes many objective topics (e.g., the technol-

ogy of information technology, transaction processing systems, internal control, etc.) and many subjective topics (e.g., systems analysis and design, management use of information, etc.). It seems that there is a great deal of consensus surrounding the objective AIS topics and a great deal of diversity surrounding the subjective topics.

Many instructors noted that a large part of information systems involves creative problem solving. Many noted that the beauty of creative problem solving is the *creativity*-a process not often present in other aspects of an undergraduate's education. Therefore, it seems to be a paradox then, that we explore consensus; i.e., uniformity in a course that encourages diversity! Therefore, it seems that a reasonable suggestion would be that we continue to develop creative solutions to the problem of teaching AIS, rather

than searching for the one model that will fit all. 

The author gratefully acknowledges the financial support of the UW-Whitewater College of Business Research Grant Program for this research.

Endnotes

1. The CPA exam is a poor guide for the AIS curriculum. Historically, EDP topics average only 4-6 points out of 100 on the auditing section of the exam. Of those points, most if not all relate to EDP auditing (4 points) and controls in EDP environments (2 points).
2. While the Walton study was published in 1997, the survey was conducted in 1993. Therefore, the present study represents an updating of some of her findings.
3. Three syllabi from schools on a quarter system were excluded from this table. They addressed four categories.
4. Other projects included skits, presentations including electronic presentations, documenting systems (drawing flowcharts, data flow diagrams, entity relationship diagrams), Internet searches, homepage design, writing Java scripts, traditional text based homework, class participation, attendance, attendance at professional meetings, etc.

References

1. American Accounting Association, "Committee on Contemporary Approaches to Teaching Accounting Information Systems," *Journal of Information Systems*, Spring 1987.
2. American Institute of Certified Public Accountants, "Information Technology

Competencies in the Accounting Curriculum,"

<http://www.aicpa.org/members/div/info-tech/itc/acidx.htm>, 1997.

3. American Institute of Certified Public Accountants, "Information Technology Competencies in the Accounting Profession," <http://www.aicpa.org/members/div/info-tech/itc/capidx.htm>, 1997.
4. Arens, A. and D.D. Ward. *Systems Understanding Aid*, Armond-Dalton Publishers, Inc., 1995.
5. Bookholdt, J.L., *Accounting Information Systems*, Richard D. Irwin, Inc., 1996.
6. Burns, T. J. "Innovative Accounting and Informations Systems Course Outlines from Thirty Universities," *Accounting Trends #23*, 1989.
7. Calderon, T. G., D. H. Olsen, and E. J. Conrad. "Database Coverage in the Accounting Information Systems Course," *Journal of Accounting and Computers*, Spring, 1996. http://www.thomson.com/swcp/acct/jac/jac12/jac12_article3.html.
8. Coppage, R. E., R. Sriram, and S. Baxendale. "Perceived Effectiveness of Integrating Computers into an Accounting Curriculum," *The Accounting Educators' Journal*, Fall 1996.
9. Davis, P. "What Computer Skills do Employers Expect from Recent College Graduates?" *T.H.E. Journal* September 1997.
10. Gelinas, U., S.G. Sutton and A. Oram. *Accounting Information Systems*, SouthWestern College Publishing, 1996.
11. Goldstein, M. M. And J. A. Hall. "Using Student Generated Cases to Teach Accounting Information Systems," *Journal of Accounting Educa-*

- tion, Winter 1996.
12. Hall, J. A. *Accounting Information Systems*, South-Western College Publishing, 1998.
 13. Heagy, C. D. and P. L. McMickle. "An Empirical Investigation of the Accounting Systems Course: Academic Practice Versus Practitioner Needs," *Issues in Accounting Education*, Spring 1988.
 14. Heagy, C. D. "Recommended Microcomputer Knowledge for Accounting Graduates: A Survey," *Journal of Accounting Education*, Summer 1994.
 15. Hollander, A. *Accounting, Information Technology, and Business Solutions*, Irwin, 1999.
 16. Jensen, R. E., and P. K. Sandlin, "Accountancy Higher Education Programs Inside the United States," <http://www.trinity.edu/~rjensen/survey1.htm>.
 17. Maher, J. J. "Developing Accounting-System Concepts and Computer Skills with a Spreadsheet Program and a Database Manager," *Issues in Accounting Education*, Fall 1993.
 18. Moscove, S., M. Simkin, and N. Baganoff. *Core Concepts of Accounting Information Systems*, John Wiley, 1996.
 19. O'Leary, D., T. Mock, L. Porter, P. Watkins, and R. Spector, "Accounting Information Systems Project; University of Southern California," <http://www.usc.edu/dept/sba/atisp/AIS/AIS-Project.html> 1996.
 20. Pillsbury, C. And G. Saemann. "Using Commercial Accounting Software to Illustrate Accounting Information Systems Topics," *Review of Accounting Information Systems*, Winter 1996-1997.
 21. Prawitt, D., M. Romney, and S. Zarowin. "The Software CPAs Use," *Journal of Accountancy*, November, 1997.
 22. Romney, M., P. Steinbart, and B. Cushing. *Accounting Information Systems*, Addison Wesley Longman, Inc., 1997.
 23. Romney, M., J. O. Cherrington, and E. L. Denna, "Using Information Systems as a Basis for Teaching Accounting," *Journal of Accounting Education*, November, 1996.
 24. Van Meer, G. and M. Adams. "Accounting Informations Systems Curriculum: An Empirical Analysis of the Views of New Zealand-Based Accounting Academics and Practioners," *Accounting Education: An International Journal*, December 1996.
 25. Walton, K. S. "Current Approaches to Structuring the Information Systems Curriculum for Accounting Majors," *The Accounting Educators' Journal*, Fall, 1997.
 26. Wilkinson, J. W., and M. J. Cerullo. *Accounting Information Systems*, John Wiley, 1997.
 27. Wood, M., P. Cahill, and J. R. Hicks. "Computer Packages as Cognitive Paradigms: Implications for the Education of Accountants," *Journal of Accounting Education*, Winter, 1997.

