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The Transformation of Accounting Information Systems Curriculum in the Last Decade

Thesis

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Major: Business Administration (Accounting)

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Abstract:

Accounting information systems (AIS) are an extremely important component of accounting and accounting education. The purpose of the current study is to examine the transformation of accounting information systems (AIS) curriculum in the last decade. The motivation for this research comes from the vast advances made in the world of information technology (IT) and information systems (IS). The specific research questions addressed in the current study are: (1) how has AIS curriculum changed in the 18 years since SOX? (2) How has AIS curriculum adjusted in recent years with the emergence of the new hot-button topic big data/data analytics? Overall, this study finds that the core of AIS curriculum has not significantly changed over the last decade. However, more emphasis is being placed on topics such as enterprise wide systems/ERP, IT audits, computer fraud, and transaction-processing. Related, several new topical coverages have been introduced such as business analysts and big data/data analytics. The key contribution of this paper is to provide accounting students and accounting educators with useful information regarding the most significant shifts in AIS over the last decade and insight into the most valuable current AIS topics.

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INTRODUCTION

Accounting is an essential part of the business world and a constantly evolving profession. According to the American Accounting Association, accounting is defined as “the process of identifying, measuring and communicating economic information to permit informed judgments and decisions by users of the information” (“How to Define Accounting for Business,” 2020, para. 5). Accounting information systems (AIS) are mostly computerized based systems that make accountants jobs easier by collecting, storing and processing financial and accounting data to produce reports that help users to make more efficient and effective business decisions (“accountingedu.org,” n.d., para. 1). It is important that AIS are covered within (or across) undergraduate college accounting curriculum in order to adequately prepare accounting students for what they will be using in the workplace.

The current study was conducted to analyze recent AIS curriculum, determine if it is up to date and to see how much it has changed in the last decade. AIS continue to adapt each year as new hot-button topics in business emerge, laws and regulations change and technological advances occur. As AIS evolve, so should its curriculum. Students that are enrolled in AIS classes should be receiving a relevant up to date education in order to prepare themselves for the CPA and most importantly, for future employment. This study will help gauge how recent AIS curriculum stacks up against the current state of AIS in the business world.

In this study, I: (1) explore how AIS curriculum has changed in the 18 years since SOX and (2) examine how AIS curriculum has adjusted in recent years with the emergence of new hot-button topic big data/data analytics. I also assess how often universities and colleges in the

United States cover the three basic functions and six basic parts of AIS in introductory AIS classes.

The method used for research in this study is archival research and builds off prior literature from a 2009 study by U. Murthy and L. Ragland: *Towards an Understanding of Accounting Information Systems as a Discipline: A Comparative Analysis of Topical Coverage in AIS and MIS Courses*. I loosely followed the research process they included in their paper and made a few minor changes. The methodology used to obtain the AIS curriculum data consists of: (1) reviewing prior research pertaining to AIS, (2) collecting syllabi of introductory AIS courses, (3) codifying AIS syllabi by topical area, (4) providing descriptive analysis of the similarities and differences in topical coverage between current AIS and 2009 AIS courses from Murthy and Ragland's research, and (5) providing descriptive analysis in topical coverage in the AIS course in response to the emergence of big data/data analytics.

The results show the most common AIS topics by revealing the percentage of syllabi that cover each topic and the average amount of class time spent on each topic. Overall the results reveal that the most common topical coverages in AIS courses have not changed significantly in the last 18 years. However, more emphasis is being placed on topics such as enterprise wide systems/ERP, IT audits, computer fraud, and transaction-processing. Related, several new topical coverages have been introduced such as business analysts and big data/data analytics. The results also show that big data/data analytics, a rising topic in AIS, is only covered in 21.2% of AIS curriculum, accounting for less than 2% of average class time.

Overall, these findings should provide useful information to students, professors and hiring accounting firms. The results show students what AIS topics they need to learn to be

successful in the workplace, while professors and hiring accounting firms can see areas of AIS that students may need to have further education and/or training.

The remainder of the paper is organized as follows. The second section of the paper reviews prior literature associated with AIS and how AIS curriculum has changed in the last decade. The third section provides the research methodology that was used to collect the topical coverage used in AIS curriculum from colleges located in the United States 2016-present. The fourth section provides the results of the research and the fifth section provides possible limitations of the research accompanied by data driven conclusions.

BACKGROUND AND PRIOR LITERATURE

Accounting

Accounting has been in existence for thousands of years and can be traced back “over 7,000 years ago among the ruins of Ancient Mesopotamia. At the time, people relied on accounting to keep a record of crop and herd growth” (“History of Accounting”, n.d., para. 2). Since then, accounting has developed immensely and has played an integral role in keeping businesses organized. Accountants have many different responsibilities and expectations in business, including financial data management, analysis and advice, financial report preparation, regulatory and reporting compliance and external business affiliations (Davis, 2019).

More recently, in 2002, a series of accounting errors and fraudulent financial practices by corporations prompted the Sarbanes Oxley Act (SOX), which introduced many new changes into the accounting industry. “The act was passed in response to a number of corporate accounting scandals that occurred in the 2000-2002 period” (Carlson, 2019, para. 2). SOX presented new laws and regulations for accountants and companies to follow and was primarily put in place “to protect investors by improving the accuracy and reliability of corporate disclosures in financial

statements and other documents” (Carlson, 2019, para. 7). One of the major changes that SOX brought to the accounting profession was an increased focus on the effectiveness and placement of internal controls for companies and their auditors. For example, “in accordance with SOX, public companies must now provide a year-end report regarding the internal controls that they have in place and the effectiveness of those internal controls” (Carlson, 2019, para. 9). In short, SOX altered the accounting profession through mandating an increased focus on internal controls with an end goal of “reduc[ing] corporate fraud and increasing investor protections” (Carlson 2019, para. 10). SOX’s regulations for internal controls drastically changed the structure of AIS education in the years following 2002.

Accounting Information Systems (AIS)

AIS are information systems in place used to collect, store and analyze financial and accounting data for stakeholders. Stakeholders include management and any other users of the financial statements. According to accountingedu.org (2018), AIS have three basic functions and six basic parts. The three basic functions of AIS are:

1. The first function of an AIS is the efficient and effective collection and storage of data concerning an organization’s financial activities, including getting the transaction data from source documents, recording the transactions in journals, and posting data from journals to ledgers.
2. The second function of an AIS is to supply information useful for making decisions, including producing managerial reports and financial statements.
3. The third function of an AIS is to make sure controls are in place to accurately record and process data.

In addition to providing the three basic functions of AIS, accountingedu.org (2018) also provides readers with the six basic parts of AIS. While the basic functions of AIS are important,

the six basic parts are of equal importance as it is necessary for them to be in the correct place so that they can be used to carry out the functions accurately and effectively. The six basic parts of AIS are the people, procedures, data, software, information technology infrastructure and internal controls associated with the system. Accountingedu.org (2018) describes the six parts as:

1. *People* who use the system, including accountants, managers, and business analysts.
2. *Procedure* and instructions are the ways that data are collected, stored, retrieved, and processed.
3. *Data* including all the information that goes into an AIS.
4. *Software* consists of computer programs used for processing data.
5. *Information technology infrastructure* includes all the hardware used to operate the AIS.
6. *Internal controls* are the security measures used to protect data (2018).

AIS within Accounting Education

While any course within a college business option could be debated, most in the field of accounting would agree, AIS is an important component of accounting education. “The importance of AIS is vital, given the essentially total reliance of accounting and auditing on computerized information system” (“What is Accounting Information Systems?” 2019, para. 2). Students need exposure to all of the parts and functions of AIS in order to grasp a well-rounded understanding of the subject. In a 2014 study, G. Kearns examined in great detail about how “the importance of AIS knowledge and skills has been assumed but rarely tested although it is an integral part of most accounting programs” (p. 24). The result of Kearns study showed that “AIS skills are valued by CPAs, perhaps exceeding the expectations and perceptions of many educators” (p. 37). This alarming conclusion shows that accounting students may be graduating

with an incomplete skillset. Additionally, more evidence is presented to show AIS may be neglected in undergraduate accounting programs. Kearns study also states:

“For most undergraduate accounting programs, the AIS course is the last course to be added to the core requirements. Some schools do not offer an AIS course. Despite the importance of technical and systems knowledge, programs are slow to change in response to market needs. Educators who wish to design programs that are more attentive to the needs of employers should heed the message of this survey: AIS skills are highly valued by CPAs” (2014, p. 37).

Kearns’ survey reveals a glaring truth about undergraduate accounting curriculum.

Despite AIS skills being highly valued by professionals in the industry, most accounting programs are not prioritizing those key skills and in some schools AIS is left out altogether. Like many accounting concepts, AIS are a complicated subject matter. However, AIS is unique in the fact that once you understand how a system functions, you can use it to simplify other tasks.

Many accounting undergraduate students do not pursue graduate level education. For example, in 2016, of the 34,889 new graduates hired by United States CPA firms, 60.7% were hired straight from their bachelor’s program (“2017 Accounting Graduates Supply and Demand Report,’ 2017, p. 6). Due to the large number of students going straight into the field after obtaining their bachelor’s degree, an accounting program that does not involve AIS in undergraduate studies (whether as a stand-alone course or as an integrated part of different courses) is neglecting its students and failing to give them a full education.

Prior Literature on AIS within Accounting Education

In 2009, U. Murthy and L. Ragland provided the blueprint for the current study by analyzing the topical coverages of introductory AIS and MIS classes covered in universities throughout the United States and Canada. Murthy and Ragland conducted their archival research by analyzing AIS syllabi from 48 universities. Their study was aimed towards “discerning the similarities and differences between AIS and MIS with the goal of better understanding: (1) AIS

as a discipline and (2) the unique aspects of AIS as an academic field” (Murthy and Ragland 2009, p. 2).

Another goal of Murthy and Ragland’s study was to determine how AIS classes changed in the years following SOX. More specifically, “how AIS courses (had) changed in recent years since passage of the Sarbanes Oxley Act of 2002, given that this legislation brought a renewed focus on the topic of internal controls” (Murthy and Ragland, 2009, p. 2). In 2002, the Sarbanes Oxley Act (SOX) altered the accounting profession through the creation of the Public Company Accounting Oversight Board (PCAOB). The PCAOB was created to “oversee the accounting industry,” playing an active role in making sure that auditors have proper internal controls (Amadeo, 2019, para. 1).

The extra emphasis on internal controls brought on by the PCAOB’s impact on AIS courses was evident, as Murthy and Ragland’s research showed that internal controls were covered in 97.8% of post-SOX syllabi, accounting for 11.7% of average class time. The rest of their findings can be found in Table 1 below (on the next page).

By singling out and examining AIS as its own course, Murthy and Ragland discovered a 2002 study by Bain, Blankley and Smith: *An Examination of Topical Coverage for the First Accounting Information Systems Course*. The study by Bain et al. provided a detailed look at the topical coverage of an AIS pre-2002. Using the results from the research by Bain et al. (2002), Murthy and Ragland were able to compare AIS topical coverage pre-2002 to the topical coverage post-2002 which is revealed in their own study. The changes in AIS topical coverage from pre-2002 and post-2002 are shown below in Table 2.

Table 1
AIS Topical Coverage
AIS Topical Coverage (Post-2002)
(Source: Table 6 in Murthy and Ragland 2009)
Using a Sample of 46 Syllabi

<u>General Topics</u>	<u>% of syllabi covering</u>	<u>average % of class time</u>
Accounting Information Systems Intro	100%	5.70%
Internal Control	97.90%	15.70%
System Documentation Techniques	91.70%	9.00%
Transaction Processing-Revenue	81.30%	6.60%
Transaction Processing-Purchasing	75%	5.20%
Database Management Systems	75%	5.40%
Introduction to Transaction Processing	75.00%	5.60%
Traditional Systems-Analysis/Design/Dev.	62.50%	3.90%
Data Modeling Techniques - General	52.1%	3.80%
Computer Fraud	50%	3.20%
Transaction Processing - HR/Payroll	43.80%	3.20%
REA Modeling	39.60%	3.80%
Transaction Processing - GL Reporting	39.60%	1.90%
File Organization and Access	35.40%	4.20%
E-Commerce	35.40%	2.30%
Transaction Processing - Production	27.10%	1.60%
IT Audit	22.90%	1.20%
Ethics	22.90%	0.90%
Other	18.80%	2.50%
Enterprise Wide Systems/ERP	18.80%	1.70%
Database/File Systems Architecture	18.80%	1.20%
Strategic Information Systems	14.60%	0.90%
Structured Query Language	8.30%	0.30%
Event Based Systems Architecture	8.30%	0.50%
Decision Support Systems	6.30%	0.50%
General Hardware and Software Issues	6.30%	0.40%
End User Computing	4.20%	0.20%
Communication Systems/Networking	6.30%	0.40%
International Issues	2.10%	0.10%

Table 2
AIS Topical Coverage Pre-2002 (Bain et al. 2002) compared to Post-2002
(Source: Table 3 in Murthy and Ragland 2009)

	<u>Pre-2002</u>			<u>Post-2002</u>			<u>Difference</u>	
	# of Syllabi	% of Syllabi Covering	Average % of Class Time	# of Syllabi	% of Syllabi Covering	Average % of Class Time	% of Syllabi Covering (Post-Pre)	Average % Class Time
General Topics								
Introduction to Systems	46	100.0 %	8.4%	48	100.0%	5.7%	0.0%	-2.7 %
Internal Control	45	97.8	11.7	47	97.9	15.7	0.1	4.0
Systems Documentation Techniques	34	73.9	6.6	44	91.7	9.0	17.8	2.4
Transaction Processing-Purchasing	33	71.7	4.0	36	75.0	5.2	3.3	1.2
Transaction Processing-Revenue	32	69.6	3.6	39	81.3	6.6	11.7	3.0
Traditional Systems-Analysis & Design	32	69.6	8.3	30	62.5	3.9	- 7.1	-4.4
Database Management Systems	30	65.2	5.2	36	75.0	5.4	9.8	0.2
Introduction to Transaction Processing	29	63.0	4.4	36	75.0	5.6	12.0	1.2
Communication Systems and Tech.	29	63.0	4.6	2	4.2	0.2	-58.8	-4.4
Transaction Processing-G/L Reporting	22	47.8	2.6	19	39.6	1.9	-8.2	-0.7
Computer Fraud	21	45.7	2.5	24	50.0	3.2	4.3	0.7
Transaction Processing- Production	20	43.5	1.8	13	27.1	1.6	-16.4	-0.2
IT Audit	19	41.3	2.5	11	22.9	1.2	-18.4	-1.3
File Organization and Access	17	37.0	2.3	17	35.4	4.2	-1.6	1.9
End User Computing	17	37.0	2.6	2	4.2	0.2	-32.8	-2.4
Transaction Processing-HR/Payroll	15	32.6	1.7	21	43.8	2.2	11.2	0.5
General Hardware and Software Issues	14	30.4	2.5	3	6.3	0.4	-24.1	-2.1
Data Modeling Techniques	14	30.4	2.0	25	52.1	3.8	21.7	1.8
REA Modeling	0	0.0	0.0	19	39.6	3.8	39.6	3.8
Other	12	26.1	2.0	9	18.8	2.5	-7.3	0.5
Database/File Systems Architecture	9	19.6	1.1	9	18.8	1.2	-0.8	0.1
Client/Server and Networking	8	17.4	0.7	2	4.2	0.2	-13.2	-0.5
Ethics	6	13.0	0.3	11	22.9	0.9	9.9	0.6
Structured Query Language	5	10.9	1.1	4	8.3	0.3	-2.6	-0.8
Event Based Systems Architecture	4	8.7	1.1	4	8.3	0.5	-0.4	-0.6
Enterprise Wide Systems	2	4.3	0.2	9	18.8	1.7	14.5	1.5
Strategic Information Systems	2	4.3	0.2	7	14.6	0.9	10.3	0.7
Executive Information Systems	2	4.3	0.1	0	0.0	0.0	-4.3	-0.1
Intelligent Agents	2	4.3	0.5	0	0.0	0.0	-4.3	-0.5
Programming	2	4.3	0.2	0	0.0	0.0	-4.3	-0.2
Expert Systems	1	2.2	0.1	0	0.0	0.0	-2.2	-0.1
Decision Support Systems (DSS)	1	2.2	0.2	3	6.3	0.5	4.1	0.3
International Issues	1	2.2	0.2	1	2.1	0.1	-0.1	-0.1
E-Commerce	0	0.0	0.0	17	35.4	2.3	35.4	2.3
Projects								
Database/Access	16	35.6	4.1	21	43.8	2.8	8.2	-1.3
Manual Systems	16	35.6	1.9	0	0.0	0.0	-35.6	-1.9
Spreadsheets	14	31.1	2.8	7	14.6	0.9	-16.5	-1.9
G/L Software	13	28.9	3.6	14	29.2	2.0	0.3	-1.6
Other	12	26.0	1.2	5	10.4	0.4	-15.6	-0.8
Communication	7	15.6	0.2	0	0.0	0.0	-15.6	-0.2
Internet	6	13.3	0.8	0	0.0	0.0	-13.3	-0.8
Flow Charting	6	13.3	0.3	4	8.3	0.4	-5.0	0.1
ERP Systems	1	2.2	0.1	5	10.4	0.4	8.2	0.3
CASE Tools	1	2.2	0.1	1	2.1	0.2	-0.1	0.1
Practice Problem (e.g., SUA)	1	2.2	0.1	7	14.6	1.9	12.4	1.8
General Office	0	0.0	0.0	1	2.1	0.1	2.1	0.1
Business Process Software	0	0.0	0.0	0	0.0	0.0	0.0	0.0
Web Page/E-commerce	0	0.0	0.0	5	10.4	0.6	10.4	0.6

The Changing World of AIS

Development of Big Data/Data Analytics

Big Data is defined as “initiatives and technologies that comprise of data that is too diverse, fast evolving, and vast for ordinary technologies, infra-structure, and skills to address exhaustively” (Belyh, 2016, para. 2). Belyh explains that the term big data originated in 2005 from Roger Mougallas, which explains why Murthy and Ragland did not find any traces of big data in the AIS syllabi they analyzed in the years shortly after SOX in 2002 (2016). However, big data has grown substantially in the last decade and has made a major impact in the accounting profession, enough of an impact to warrant attention plenty of attention in AIS classes.

New hot-button topics will continue to infiltrate the accounting industry as we continue to make technological advancements, but it is important to differentiate and focus on what topics are the most relevant and beneficial to accountants. Jim Boomer explains that “big data has become a buzzword in the accounting profession, but like other trending topics such as blockchain, AI (artificial intelligence) and machine learning, its’s one that CPAs really need to understand” (2018, para. 1). In order to better understand big data, Boomer breaks down the definition into three separate parts: volume, velocity and variety. Volume deals with the large amount of data that traditional data management systems could not handle, velocity has to do with the speed that the data can be processed and variety is the different types of formats that the data may be presented as (2018). Most people should know about big data in general, as it is one of the fastest growing trends in technology, however, is extremely relevant and important for those in the accounting profession to understand how it works and how it can be used to make their jobs easier.

Big data is used many ways to simplify tasks in the accounting industry. Three ways that big data is currently utilized to make accountants jobs easier are in data-driven audits, monitoring/improving business performance and identifying/managing risk (Boomer, 2018). In reference to Table 1, Murthy and Ragland found that 3 different types of transaction processing were among the top 10 topical coverages in AIS courses. Data analytics can be used to monitor these transactions and help improve business performance. Another common topical coverage in 2009 AIS courses was computer fraud. If used correctly, big data can be used to identify and manage risk that would be associated with fraud, “the sooner accountants can identify these risks, the better chance they have of helping clients mitigate risks and protect performance” (Boomer, 2018, para. 8). Big data/data analytics were not covered (or shown to be covered) in any of 2009 AIS syllabi because it was not advanced or as prevalent as it is today. One decade later, it is important to discover if the lack of coverage has changed and how much it has changed. In today’s environment, an effective introductory AIS course at the college/university level should include a section on big data/data analytics in order to prepare students for success in the accounting industry.

AIS Introductory Course Topical Coverage Content

With the functions and parts of AIS that are provided by accountingedu.org, along with previous research from Murthy and Ragland (2009), I created a simple framework that one might expect to be useful in crafting an effective AIS curriculum in the 2019-2020 school year. Taking the most common topical coverages (considered as over 50% of syllabi coverage) from Murthy and Ragland’s 2009 research, combined with the three basic functions and six basic parts of AIS and an increased focus on data analytics, I present an example curriculum (please see Figure 1 below).

It is important to remember that this is a basic level (i.e., minimum level) recommendation for an AIS curriculum and it is meant for AIS courses taking place in 2019-2020 and into the near future. In order to remain effective, the curriculum should be re-evaluated each semester as new hot-button topics can enter the industry at any time. The recommended curriculum can be compared to the results of the current study to help determine how up to date and effective current AIS curriculum is in United States universities and colleges.

Figure 1
Recommended Minimum AIS Curriculum
(Using data from Murthy and Ragland 2009; Accountingedu.org 2018; Jim Boomer 2018)

1. Introduction to Accounting Information Systems
2. Internal Controls
3. System Documentation Techniques
4. Transaction Processing (Revenue, Expenditure)
5. Database Management Systems
6. Traditional Systems Analysis/Development/Design
7. Data Modeling Techniques
8. Computer Fraud
9. Data Analytics

RESEARCH QUESTIONS

The purpose of the current study is to build upon prior research and explore how advances in technology are important to AIS and AIS education. Through this study I focus on two main research questions:

1. How has AIS curriculum changed in the 18 years since SOX?
2. How has AIS curriculum adjusted in recent years with the emergence of the new hot-button topic big data/data analytics?

It is relevant to explore how AIS curriculum has changed in the 18 years since SOX because of the tremendous advances in technology and changes in laws and regulations that have occurred over the last two decades. It is important that AIS curriculum is as up to date as

possible and that the topical coverage reflects the current usage of information systems in the accounting industry.

It is expected that core topical coverage like internal controls, systems documentations techniques, transaction processing and computer fraud will continue to cover a large portion of AIS curriculum. However, new topical coverages should have emerged over time to demonstrate that curriculum is keeping up with industry changes and students are receiving a well-rounded undergraduate accounting education to prepare for employment upon graduation.

METHODOLOGY

Method

To address my research questions, I conducted archival research. The 2009 Murthy and Ragland (2009) study provided detailed information on post-2002 AIS topical coverage which I used to both model my research methodology and eventually compare my results to. The first step of my research involved collecting AIS syllabi (post-2015) and pulling topical coverages laid out in the syllabi. The objective of compiling data from post-2015 syllabi was to determine how much AIS topical coverage has changed in the last decade and to further investigate any new topics that emerged. In order to satisfy my research questions, 33 syllabi for introductory undergraduate AIS courses from universities and colleges in the United States were retrieved by using key-word Internet searches.

Sample Selection

The AIS syllabi were collected from web search engines using key words and phrases such as “Accounting Information Syllabus,” “AIS,” “2016,” “2017,” etc. Changing key words and phrases was essential to help find the correct courses and years so I could create a sizable sample that was comparable. Syllabi needed to satisfy several criteria to be used in the sample.

The criteria for eligibility in this study included the following: The syllabus must contain an outline/class schedule with specific topical coverage or textbook chapters (with an accessible online textbook to gather topical coverage from table of contents) covered for the course, the syllabus must be for an undergraduate introductory level AIS course, the syllabus must be from a college or university in the United States (to help control for accreditation requirements), the syllabus must be relatively current (2016-2019) and the syllabus must contain a total number of class meetings, weeks or modules to be completed in the case of online courses. The total number of class meetings makes it possible to determine the percentage of time a specific topical coverage is reviewed for that particular course.

Analyzing the Data

After the collection process, each syllabus was reviewed individually and categorized by topical coverage found in the course syllabus. The data was compiled in Microsoft Excel spreadsheets. The far left column had a list of the topical coverages retrieved from each syllabus. The second column had the number of syllabi covering each topical coverage, the third column had the percentage of syllabi covering each topical coverage and the fourth column had the average percentage of class time spent on each topical coverage. The remaining columns were dedicated to each college or university to display what topical coverages they covered and for how many class periods total. A cumulative total row allowed me to determine what percentage of syllabi cover certain topics.

I tracked what percentage of class time is spent on each topic by recording the total number of classes spent on each topic for every school and dividing that by how many classes are held in total between all the syllabi. For example, if internal controls was covered twice in a course that had 20 class meetings, a two was put into the total class internal control topical

coverage row, this total class coverage row filtered into the total internal control row which was divided by the grand total of all classes which gave me the total average percentage of class time covered. At the same time, in a separate excel sheet internal controls was recorded as a topical coverage for that one specific course and added to a total row which had the grand total number of syllabi that cover that topic divided by 33 (the number of syllabi in the sample) which gave me the total number of syllabi that covered internal controls. For example, internal controls were covered in 31 syllabi, which when divided by the 33 total syllabi, comes out to 93.94% of all syllabi.

RESULTS

The results of the research are laid out in two separate sections, current AIS topical coverage and AIS topical coverage changes in the last decade. The first section titled current AIS topical coverage reveals and analyzes topical coverages from Fall 2016-present introductory syllabi. The first section includes general topics covered as well as projects covered to supplement the general topical covered to help provide a more complete analysis of current AIS courses. This section also identifies the top ten topical coverages of current AIS syllabi.

The second section, AIS topical coverage changes in the last decade, reveals major changes of AIS curriculum in the last decade by identifying topics that had the largest increase and decrease among percentage of syllabi coverage, as well as the greatest change in percentage of average class time. The changes over the last decade are discovered by comparing present syllabi data to 2009 AIS syllabi data provided by Murthy and Ragland's study. This section also shows new topics that have been incorporated into curriculum over the last decade, such as big data/data analytics.

Current AIS Topical Coverage

The data from recent AIS syllabi reveal which topics are covered and on average, how much class time is spent covered each topic. There are ten general topical coverages that appear in over 50% of syllabi, which combine to take up about half of total average class time at 48.3%.

These ten topics include accounting systems introduction, internal control, transaction business process-revenue, transaction processing-purchasing, computer fraud, database management systems, introduction to transaction processing, IT audit, transaction processing-production and enterprise wide systems. The topic that is covered in the most syllabi is AIS introduction. 96.7% of classes have some sort of AIS introduction class or span of classes covering about 8.4% of time in each course. It is expected that some sort of introduction to AIS would be covered in every single course and it is likely that classes that did not list it on their syllabi still would have touched on it on the first day of the course.

The topic that classes spend the most time covering on average is internal controls. Internal controls are covered in 93.94% of classes and take up 11.7% of average class time. The large amount of time spent teaching and reviewing internal controls is not surprising due to rules and regulations regarding internal controls that stem from SOX.

Most syllabi reveal that not all learning comes directly from textbooks and lectures. Many courses use projects to focus on additional topical coverages and to enhance learning both inside and outside of the classroom. The syllabi reveal that introductory AIS courses use 21.4% of total class time on average discussing and working on specific projects. The most common project is Systems Understanding Aid (SUA) which mainly focuses on the topical coverages of transaction processing and flowcharting. The SUA is covered in 33.3% of classes and accounts for 6.1% of class time on average. The second most common project seen on syllabi is a

tableau/Excel project which cover the topics of database managements systems and data modeling. Tableau/Excel projects are found on 24.2% of syllabi and take up 2.2% of average class time. It is also worth noting that 30.3% of syllabi include an unidentified project as a part of the course schedule. As such, these projects are accounted for in the unspecified/other category. The total breakdown of topical coverage from the most recent AIS syllabi can be seen in Tables 2 and 3 below.

Table 2
AIS Topical Coverage
(Based on sample of 33 syllabi)

<u>General Topics</u>	<u>% of syllabi covering</u>	<u>average % of class time</u>
Accounting Information Systems Intro	96.97%	8.36%
Internal Control	93.94%	11.70%
Transaction Processing-Revenue	81.82%	6.37%
Transacation Processing-Purchasing	81.82%	5.97%
Computer Fraud	78.79%	6.03%
Database Management Systems	75.76%	4.69%
Introduction to Transaction Processing	72.73%	3.62%
IT Audit	54.55%	3.49%
Transcation Processing - Production	54.55%	3.30%
Enterprise Wide Systems/ERP	54.55%	3.13%
System Documentation Techniques	45.45%	3.67%
Transaction Processing - HR/Payroll	45.45%	1.81%
Transaction Processing - GL Reporting	45.45%	2.65%
Traditonal Systems-Analysis/Design/Dev.	36.36%	3.43%
Data Modeling Techniques - General/REA Modeling	30.30%	2.92%
Flowcharting	24.24%	1.49%
Data Analytics/Big Data	21.21%	1.60%
XBRL	18.18%	1.12%
Sarbanes Oxley/IT Governance	15.15%	1.01%
E-Commerce	12.12%	1.20%
Accountants as Business Analysts	12.12%	0.48%
Coding Schemes	6.06%	0.21%
Blockchain/Bitcoin	3.03%	0.16%

Table 3
AIS Topical Coverage of Projects
(Based on sample of 33 syllabi)

<u>Project Types</u>	<u># of syllabi covering</u>	<u>% of syllabi covering</u>	<u>average % of class time</u>
Systems Understanding Aid/Flowchart	11	33.33%	6.07%
Unspecified/Other	10	30.30%	3.79%
Tableau/Excel	8	24.24%	2.22%
Quickbooks	8	24.24%	4.87%
SAP	6	18.18%	2.16%
Field Research/Research Paper	4	12.12%	0.64%
Case Study	4	12.12%	0.88%
Access	4	12.12%	0.80%

AIS Topical Coverage Changes in the Last Decade

After comparing the results to the results of Murthy and Ragland (2009), it is clear that there have been many changes in AIS curriculum over the last decade. There are several topics that have seen an increase (of greater than 25%) in syllabi coverage. This group included enterprise wide systems/ERP which increased by 35.7% (from 18.8% to 54.5%), IT audit which rose by 31.6% (from 22.9% to 54.5%), computer fraud which increased by 28.8% (from 50% to 78.8%) and transaction processing-production which increased 27.4% (from 27.1% to 54.5%).

Other topical coverages that made large increases in syllabi coverage of over 10%. This group includes flowcharting at 24.2%, data analytics/big data at 21.2%, eXtensible Business Reporting Language (XBRL) at 18.2%, Sarbanes Oxley/IT governance at 15.2% and accountants as business analysts which increased 12.1%.

While some topics have seen increases, in the frequency of which they are found on current syllabi, other topics have garnered a higher percentage of average class time. Computer fraud increased 2.8%, jumping from 3.2% of 6% of average class time. It also appears that professors are spending more time on the introduction of AIS as a whole as the topical coverage

of AIS intro increased 2.7%, rising from 5.7% to 8.4% of average class time. IT audit also saw a large increase in average class time, jumping 2.3%, 1.2% to 3.5%. Other classes that gained over a full percentage point of average class time include transaction processing-production at 1.7%, data analytics/big data at 1.6%, flowcharting at 1.5%, enterprise wide systems/ERP at 1.4% and XBRL at 1.1%.

As some topics have made major increases in percentage of syllabi coverage in the last decade, others have had major decreases. Systems documentations techniques dropped the most at 46.2% (from 91.7% down to 45.5%) syllabi coverage. File organization and access dropped 35.4% all the way down to 0% as a general topic, however file organization and access are both common project topics and are still represented in current syllabi in that fashion. Data modeling techniques dropped 21.8% (from 52.1% down to 30.3%) of syllabi coverage.

There are several topical coverages that have lost a large average percentage of class time over the last decade. File organization and access dropped 4.2% down to 0% of average class time. However, Access projects still make up .8% of class time so it has not been abandoned completely. Internal controls dropped 4% (from 15.7% of average class time down to 11.7%.) Despite the large drop in average class time in the last decade, professors still cover internal controls more than any other topic by a wide margin of 3.3% of class time. Another topical coverage that saw a sizable drop in average class time is introduction to transaction processing, down 2.0% (from 5.6% to 3.6%). Professors are still spending a large amount of time on specific transaction processing but have shortened the introduction to the topic as a whole. In total, transaction processing topics (introduction, production, revenue, purchasing, HR/payroll and GL reporting) make up 23.7% of average class time. Other topical coverages that had an average class time decrease of greater than 1% were transaction processing-HR/payroll which

dropped 1.4%, database/file systems architecture which dropped 1.2% and e-commerce which dropped 1.1%. The overall comparison of 2009 AIS syllabi and current (post-2016) syllabi can be found below in Table 4, new topics that emerged Post-2009 can be seen in Table 5.

Table 4
AIS Topical Coverage Change (Post-2009)
(Based on sample of 33 current syllabi and sample from Murthy and Ragland, 2009.
Source: Tables 1 & 2)

General Topics	2009		Post 2009		Difference (Post-Pre)	
	<u>% of syllabi covering</u>	<u>average % of class time</u>	<u>% of syllabi covering</u>	<u>average % of class time</u>	<u>% of syllabi covering</u>	<u>average % of class time</u>
Accounting Information Systems Intro	100.0%	5.7%	97.0%	8.4%	-3.0%	2.7%
Internal Control	97.9%	15.7%	93.9%	11.7%	-4.0%	-4.0%
Transaction Processing-Revenue	81.3%	6.6%	81.8%	6.4%	0.5%	-0.2%
Transaction Processing-Purchasing	75.0%	5.2%	81.8%	6.0%	6.8%	0.8%
Computer Fraud	50.0%	3.2%	78.8%	6.0%	28.8%	2.8%
Database Management Systems	75.0%	5.4%	75.8%	4.7%	0.8%	-0.7%
Introduction to Transaction Processing	75.0%	5.6%	72.7%	3.6%	-2.3%	-2.0%
IT Audit	22.9%	1.2%	54.5%	3.5%	31.6%	2.3%
Transaction Processing - Production	27.1%	1.6%	54.5%	3.3%	27.4%	1.7%
Enterprise Wide Systems/ERP	18.8%	1.7%	54.5%	3.1%	35.7%	1.4%
System Documentation Techniques	91.7%	9.0%	45.5%	3.7%	-46.2%	-5.3%
Transaction Processing - HR/Payroll	43.8%	3.2%	45.5%	1.8%	1.7%	-1.4%
Transaction Processing - GL Reporting	39.6%	1.9%	45.5%	2.6%	5.9%	0.7%
Traditional Systems-Analysis/Design/Dev.	62.5%	3.9%	36.4%	3.4%	-26.1%	-0.5%
Data Modeling Techniques - General/REA	52.1%	3.8%	30.3%	2.9%	-21.8%	-0.9%
Flowcharting	0.0%	0.0%	24.2%	1.5%	24.2%	1.5%
Data Analytics/Big Data	0.0%	0.0%	21.2%	1.6%	21.2%	1.6%
XBRL	0.0%	0.0%	18.2%	1.1%	18.2%	1.1%
Sarbanes Oxley/IT Governance	0.0%	0.0%	15.2%	1.0%	15.2%	1.0%
E-Commerce	35.4%	2.3%	12.1%	1.2%	-23.3%	-1.1%
Accountants as Business Analysts	0.0%	0.0%	12.1%	0.5%	12.1%	0.5%
Coding Schemes	0.0%	0.0%	6.1%	0.2%	6.1%	0.2%
Blockchain/Bitcoin	0.0%	0.0%	3.0%	0.2%	3.0%	0.2%
File Organization and Access	35.4%	4.2%	0.0%	0.0%	-35.4%	-4.2%
Database/File Systems Architecture	18.8%	1.2%	0.0%	0.0%	-18.8%	-1.2%
Strategic Information Systems	14.6%	0.9%	0.0%	0.0%	-14.6%	-0.9%
Structured Query Language	8.3%	0.3%	0.0%	0.0%	-8.3%	-0.3%
Event Based Systems Architecture	8.3%	0.5%	0.0%	0.0%	-8.3%	-0.5%
Decision Support Systems	6.3%	0.5%	0.0%	0.0%	-6.3%	-0.5%
General Hardware and Software Issues	6.3%	0.4%	0.0%	0.0%	-6.3%	-0.4%
End User Computing	4.2%	0.2%	0.0%	0.0%	-4.2%	-0.2%
Communication Systems/Networking	6.3%	0.4%	0.0%	0.0%	-6.3%	-0.4%
International Issues	2.1%	0.1%	0.0%	0.0%	-2.1%	-0.1%

Table 5
New Topical Coverages (Post-2009)
(Based on sample of 33 current syllabi & sample from Murthy and Ragland, 2009 Source: Tables 1 & 2)

<u>General Topics</u>	<u>% of syllabi covering</u>	<u>average % of class time</u>
Flowcharting	24.2%	1.5%
Data Analytics/Big Data	21.2%	1.6%
XBRL	18.2%	1.1%
Sarbanes Oxley/IT Governance	15.2%	1.0%
Accountants as Business Analysts	12.1%	0.5%
Coding Schemes	6.1%	0.2%
Blockchain/Bitcoin	3.0%	0.2%

DISCUSSION AND CONCLUSION

Conclusion Based on Findings

The results from the current study show that the current AIS syllabi are covering the majority of the most important topics as suggested by Figure 1. The most common topics are not expected to change drastically because the basics of AIS are not going to change. Overall, topical coverage has not changed significantly in the last decade, suggesting that new hot-button topics like data analytics need to be incorporated into more syllabi. Data analytics is only covered in 21.2% of the syllabi reviewed, accounting for 1.6% of class time. Data analytics may need to be infused into more curriculum to keep up with industry changes. In order to anticipate for the next hot-button (information system) topic like data analytics to appear in the field of accounting, additional time may need to be built into AIS curriculum so changes can be made as needed and to ensure students are getting a complete and up to date education of accounting as it relates to systems. This will better prepare students for the future.

Limitations

There are several limitations this study could be subjected to that need to be considered when reviewing the data. Every class syllabus that was examined did not use the same textbook

and did not use the same terminology when referring to each topical coverage. This may have led to incorrect grouping and/or oversimplification of topics (e.g., this may have led to misinterpreting some topics as similar when they were not). The same can be said with the comparison of the results from this study with the results of Murthy and Ragland's (2009) study. Murthy and Ragland had their own topical coverage terminology and groupings and I tried to replicate that to the best of my ability. Differences in terminology and grouping could explain some of the changes that occurred in the last decade from the results section. Related, this study was conducted with simple Google searches. It did not include interviews and/or questions with professors regarding the content of the syllabi, curriculum and/or topical coverages. Further, it is also possible that the sample of syllabi is not representative of the entire population of AIS syllabi in the United States because the sample includes only syllabi that were available online. Another possible limitation is textbook publishing lag. It is possible that new textbooks are currently being produced and major changes to AIS textbooks are coming soon but this study was unable to identify them because the new textbooks not available yet.

Opportunities for Future Research

This study is set up for easy replication. As long as AIS syllabi are available online this study can be repeated again in the future to see how AIS curriculum has developed. This can provide useful insight for accounting educators to make sure they are keeping up with changes in AIS curriculum. Accounting students could also benefit from this insight as well to make sure they are educated on important aspects of AIS and are able to compete against their fellow peers when applying for jobs. Another possible path for future research could include researching ways to supplement and improve AIS curriculum, which in turn will bring more knowledge students and further prepare them for their accounting careers. For example, tools like Alison's Data

Analytics – Mining and Analysis of Big Data, which is a free course that only takes 2-3 hours and teaches students “the most effective and simple methods of mining and analyzing big data,” could be used to supplement information taught in the classroom or out of a textbook (alison.com, 2020, para. 1). It is well worth it to research and discover the most efficient and effective data analytics tools to teach AIS students.

References

- AICPA. (n.d.). 2017 Accounting Graduates Supply and Demand Report. Retrieved from <https://www.aicpa.org/interestareas/accountingeducation/newsandpublications/downloadabledocuments/2017-trends-report.pdf>
- Amadeo, K. (2019, October 27). 4 Ways Sarbanes-Oxley Stops Corporate Fraud. Retrieved March 18, 2020, from <https://www.thebalance.com/sarbanes-oxley-act-of-2002-3306254>
- Belyh, A. (2019, September 23). Brief History of Big Data. Retrieved March 20, 2020, from <https://www.cleverism.com/brief-history-big-data/>
- Boomer, J. (2018, September 10). The Value of Big Data in an Accounting Firm. Retrieved March 20, 2020, from <https://www.cpapracticeadvisor.com/firm-management/article/12424744/the-value-of-big-data-in-an-accounting-firm>
- Data Analytics Course - Big Data & Data Mining (Free Online): Alison. (n.d.). Retrieved from <https://alison.com/course/data-analytics-mining-and-analysis-of-big-data>
- Davis, S. S. (2019, March 1). What Role Does an Accountant Play in Business Operations? Retrieved from <https://smallbusiness.chron.com/role-accountant-play-business-operations-411.html>
- History of Accounting - Introduction to Bookkeeping. (2019, January 2). Retrieved from <https://fremont.edu/history-of-accounting/>
- Kearns, G. S. (2014). The Importance of Accounting Information Systems in the Accounting Curricula: A CPA Perspective. *AIS Educator Journal*, 9(1), 24–40. doi: 10.3194/1935-8156-9.1.24
- Murthy, U. S., & Ragland, L. (2009). Towards and Understanding of Accounting Information Systems as a Discipline: A Comparative Analysis of Topical Coverage in AIS and MIS Courses. *AIS Educator Journal*, 4(1), 1–15. Retrieved from <https://www.aisej.com/doi/abs/10.3194/aise.2009.4.1.1>
- What are Accounting Information Systems? (2018). Retrieved March 19, 2020, from <https://www.accountingedu.org/accounting-information-systems.html>
- What Is Accounting? All About Accounting. (2020, February 5). Retrieved from <https://www.businessnewsdaily.com/2689-accounting.html>
- What is Accounting Information Systems. (n.d.). Retrieved from <https://aaahq.org/AIS/About>