Foundations of Information Systems Course Content: A Comparison of Assigned Value by Faculty, Recruiters, and Students

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Abstract:

This research compares the value placed on the content of the foundations of information systems course by three stakeholders: faculty, recruiters, and students. Given the declining enrollments in IS that led ACM/AIS to redesign its curriculum in an attempt to help universities reverse this trend, we need to assess the value placed on this curriculum by stakeholders. Although all majors in a business school are typically required to take the foundations of IS course, its real or perceived value to businesses and future employers is unclear. A first step in evaluating the entire curriculum is to focus on the foundations of IS course. Results differ among the stakeholders, and discussions highlight the need to continually improve the curriculum to fit the needs and the assigned importance of the diverse stakeholders.

Keywords: Information Systems Curriculum, Foundations of Information Systems Course, Content, Information Systems Core.

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I. INTRODUCTION

Since 2001, enrollment in some management information systems (MIS) programs has been declining and some news outlets are even recommending that students avoid MIS as a major area of study (Marshall, Cardon, & Godin, 2014; Kolovik, 2013; Loose, 2012; Saunders, & Lockridge, 2011; Granger, Dick, Jacobson, & Van Slyke, 2007). While computer science majors have risen in the last five years, there has been modest or flat growth in the MIS area (Marshall et al., 2014). This has led business schools and MIS departments to examine the value provided by an MIS degree in general and the foundations of IS course in particular. In some instances, MIS departments have been dissolved and, in other cases, MIS offerings have been trimmed down or relegated to faculty in other departments in business schools, who are often not as well equipped to teach the material.

The declining enrollments were so widespread that the Association for Computing Machinery (ACM) and the Association of Information System (AIS) redesigned its curriculum in the hopes of guiding university programs and reversing the trend (Topi et al., 2009). All majors in a business school are typically required to take the foundations of IS course; however, what real or perceived value this course provides is unclear. If some colleges are debating whether to remove the foundations of IS course from the curriculum, then the implication is that the perceived value is lacking. In this paper, using a survey methodology, we examine the content of the foundations of IS course recommended by ACM/AIS from the perspective of three stakeholders; namely, business faculty, business students, and recruiters.

The paper is structured as follows: in Section 2, we identify the stakeholders of the foundations of IS course and outline the importance that IS plays in their lives. In subsequent sections, we address prior research on factors affecting the IS course content and its value, and we review the current curriculum designed by ACM/AIS members and topics included in IS textbooks. We then detail the study we undertook in Section 6. In Section 7, we report the results from our study and discuss our findings. In Section 8, we conclude with possible implications that Business Schools may wish to consider as a result of our findings.

II. STAKEHOLDERS OF THE FOUNDATIONS OF IS COURSE CONTENT

The foundations of IS class should be valued by those who are enrolled in it, those who are teaching it, and those who will ultimately benefit from it; namely, potential recruiters of business school graduates. Non-IS faculty should also value the foundations of IS course since information systems affect every student and every major in a business school. Regardless of students' majors in the business school, they are likely required to take the foundations of IS course. During their careers, these students will benefit from their IS knowledge because systems are used in all areas of business (Granger, Dick, Luftman, Van Slyke, & Watson, 2007). Because there are many stakeholders of the foundations of IS course content, it is imperative that the course's content be closely scrutinized to add as much value as possible to students' learning and its applicability to their future careers. Our research continues the efforts of Trauth, Farwell and Lee (1993), who examined the potential expectation gap between industry and academia by surveying IS managers, end user managers, IS consultants, and IS professors. We focus on recruiters', students', and MIS faculty's perspectives.

Beyond choice of major, unvalued course content may be ignored such that non-IS majors may not even understand the foundations of IS that all business students need to have to be adequately prepared for their careers.

III. STUDY

As universities chase student dollars to stay afloat in these turbulent economic times, many, if not most, are focusing heavily on the student experience. Although many people would agree that the student experience is important, some wonder if we are doing long-term harm to students by adjusting course content to make them happy in the short term while making them far less marketable in the long-run by failing to meet recruiters' needs. In the case of IS majors/minors, students' comments have led many to believe that students do not fully appreciate content of the foundations of IS course. If this is true, it could be a leading factor in their deciding to choose other majors/minors. Before suggesting that we make drastic curriculum changes, however, we examine the curriculum content of the foundations of IS course and seek opinions from not only students but also faculty members and recruiters. With this knowledge, we can determine how each group values specific content in the course and offer insights about changes to the course's content.

IV. CURRICULUM FOR THE FOUNDATIONS OF IS COURSE

We first reviewed the curriculum for the foundations of IS course, which a select committee formed jointly by members of both the Association of Computing Machinery (ACM) and the Association of Information Systems (AIS) developed. The set of topics is recommended to be included in the foundations of IS courses taught at accredited universities around the world (Topi et al., 2009). We also reviewed topics from leading IS textbooks. Based on our analysis of the topics covered in the textbooks and the recommended topics by the ACM/AIS committee, we developed our list of topics: IS components, IS in organizations, globalization, valuing IS, IS infrastructure, the Internet and the WWW, business intelligence, IS security, IS development and acquisition, and IS ethics.

IS components covers the basics of IS and includes hardware and software availability and use, and how systems capture, store, and use data. It also includes the study of networks and network components, location considerations and facilities management.

IS in organizations includes sections on IS career opportunities, IT project valuation, IS quality and familiarization with various measures available to determine quality, IT strategies, and how organizations can use IT to gain and maintain a competitive advantage.

IT globalization covers the need to have a thorough grasp of technology-enabled change and an understanding of the digital divide. This topic also includes information on global IT strategies and the importance of cross-cultural issues associated with the various strategies pursued by corporations with a worldwide footprint.

Valuing IS includes a section on familiarization with the skills and knowledge necessary to appropriately value IT. This topic also deals with the productivity paradox and various IT investment analysis tools. According to the ACM/AIS committee and the topics covered in the textbooks, a good foundation in systems evaluation is important for all business majors.

IS infrastructure and infrastructure requirements include those related to computer system hardware components, system software components, data and data storage, maintenance, and IT services and support.

The Internet and WWW covers e-commerce, e-business, e-government, and familiarization with the many social networking applications that are available. This topic should also include Intranets, their characteristics, and purpose.

Business intelligence and the various decision making tools that are available to organizations covers items such as 1) knowledge discovery tools, 2) system applications and utility tools, 3) digital dashboards and their use to management, and 4) geographic information systems.

IS security covers items such as security awareness and security management. Security awareness addresses the many security threats to which a system is potentially exposed and the human and technological safeguards that are available to keep them secure. Security management deals with techniques that familiarize students with system security planning issues and techniques.

IS development and acquisition covers the tools available in analysis and design tasks. System development life cycles and alternative methods to system design are included in this topic. The ACM/AIS committee also lists the need for IS professionals to understand the importance of user-driven design and the potential benefits and risks associated with outsourcing systems development projects.

Lastly, given the continued instances of unethical actions and behaviors by many individuals in leadership roles, the ACM/AIS committee suggest that the foundations of IS course should cover IS ethics. The committee highlights privacy issues and the different privacy expectations and rules in place across the world as an important area of study, especially in the design and development of IS for global markets. The committee also lists data accuracy and information standards as important areas of study. Finally, it suggested including content related to cyber war, cyber terrorism, computer crime, and the available tools to help find and prevent the continued occurrence of these actions (e.g., computer forensics).

V. CURRICULUM FROM IS TEXTBOOKS

With our list of topics in mind, we reviewed some of the top IS/IT textbooks to compare their focus with the committee's recommendations. We found that many of the textbooks included chapters on most of the recommended topics. While not every textbook included every single topic area, for the most part, all textbooks

covered the main topics and touched on many of the subcategories as listed above. The table below shows the main topic areas included in the textbooks and indicates which authors covered them.

Table 1: Foundations of Information Systems Topics					
	IS components	IS in organizations	Globalization	Valuing IS	IS infrastructure
O'Brien & Marakas (2008)	x	x	x		x
Laudon & Laudon (2009)	x	x	x		x
Haag & Cummings (2008)	x				
Baltzen & Phillips (2009)	x	x	x		x
Huber, Piercy, & McKeown (2008)	x	x	x	x	x

Table 2: Foundations of Information Systems Topics Continued					
	Internet & WWW	IS security	Business intelligence	IS ethics	IS development
O'Brien & Marakas (2008)	x	x	x	x	x
Laudon & Laudon (2009)	x	x	x	x	x
Haag & Cummings (2008)	x	x	x	x	x
Baltzen & Phillips (2009)	x	x	x	x	x
Huber, Piercy, & McKeown (2008)	x	x	x	x	

VI. RESEARCH METHOD AND ANALYSIS

Using the combined topics and subtopics from the ACM/AIS curriculum and the textbooks, we used a Web-based survey instrument to collect data from faculty members, recruiters, and students about their perceived value of these topics and subtopics. We solicited the faculty members from a well-known AIS listserv. Of the 352 faculty who agreed to participate, we obtained 252 usable responses. We solicited recruiters through campus recruiting from a large Northeastern university. Of the 152 recruiters that agreed to participate, we received 64 usable responses. Finally, we recruited students from 3 medium to large U.S. universities. Of the 285 students who agreed to participate, we received 256 usable responses.

Understanding how these stakeholders value each topical area can provide direction about what to add, delete, or possibly change from the foundations of IS course. In order to test how well these stakeholders valued the content, we used SPSS version 20 to compare the means of the combined items under each curriculum topic across each stakeholder. Individual topic areas comprised between 3 and 5 items, which we averaged to form the comparison topic area.

VII. RESULTS AND DISCUSSION

Table 3 below details the mean values for each topic area for each stakeholder. The means are on a 7-point scale. The text describing the differences in stakeholders are based on those mean differences at or below a significance level of .05.

IS Components

Faculty and recruiters considered topics that fall into the IS component category such as basic hardware and software issues, data capture, storage and use, and networks as more valuable than students considered them to be. While faculty and recruiters recognize the importance of how, for example, data is captured, stored, and used by an organization in such a way as to provide value to the organization, the significance and importance of such an issue may be lost on students, especially those without work experience. Faculty/recruiters see it as a building block

and understanding these issues are important before one can fully appreciate the more senior management/strategy topics, whereas general business students consider these topics more technical in nature (outside of area of interest).

IS in Organizations

Recruiters and student perceived topics such as IT project valuation, IS quality, IT strategies, and how organizations can use IT to gain and maintain a competitive advantage as less significant to the MIS curriculum than faculty did. The topics included in IS in organizations are often deemed "soft skills" in MIS, and, while recruiters appreciate potential employees to be able to critically think about such issues, it is quite a bit more difficult to quantify these skills. Also, although these skills are initially introduced in the classroom, they are honed while working. Recruiters and students perceiving these topics as less significant to the MIS curriculum than faculty do is likely due to faculty having a "bigger picture" insight/long-term view of applying IT. Recruiters and students are likely focusing more on immediate needs and immediate skill sets. IS and the organization is definitely a topic with a longer-term perspective.

Globalization

From the analysis, faculty and students viewed topics related to global IT strategies, cross-cultural issues, and technology-enabled change as more important than recruiters did. Recruiters often don't associate globalization issues with studying IS. Rather, they view the knowledge of global issues as a nice complement to other skills. In addition, another explanation for this result is that the recruiters used in this study did not have international responsibilities (only recruiting for a U.S. office); thus, they may not have recognize the importance of global IT as much as faculty and students.

Valuing IS

Faculty considered issues relating to the skills and knowledge necessary to appropriately value IT more critical to the MIS curriculum than either recruiters or students. Typically, these skills are deemed specialized or expert-focused and not ones on which all students need to concentrate. As we detail above, faculty tended to have a longer-term perspective on issues like this compared to recruiters and students.

IS Infrastructure

While faculty and recruiters perceived topics such as computer system hardware components, system software components, data and data storage requirements, and IT services and support as important, students rated those topics as less important. Faculty and recruiters look at multiple skills and a broader skill set (and think that is necessary), while students want to stay away from more technical issues (Marshall, et al., 2014). Typically, students perceive the more technical aspects of IS as being warranted for computing majors (whether MIS, computer science, or engineering). It is not unusual that students in business schools are less interested in the more technical side of IS and leave those areas for more technical programs like computer science.

The Internet and WWW

All three stakeholders rated the Internet and the WWW differently. Students rated it the highest in terms of importance, followed by faculty and recruiters, respectively. This is in line with Marshall et al.'s (2014) study in which they found that students felt that Web design was the most important topic for their careers. Students live for the Web—everything they do is Web-related (social networks, shopping, music, etc.). Millennials are constantly on the Web and social media, and, therefore, this finding should come as no surprise. Students feel that knowledge of the Web is going to be very important to them while recruiters don't (unless they are recruiting for a social network position). Recruiters might see this topic as more of a distraction rather than a legitimate skill. Faculty members certainly experience the frustration of the Internet on student-held devices used in class.

Business Intelligence

While faculty and students differed in their perceptions of the value of business intelligence in the MIS curriculum (with faculty rating it higher in importance), recruiters rated it slightly higher than students (though they were statistically equal). With the advent of big data and the rise in the use of business intelligence, faculty members realize the importance of thoroughly learning about this issue. Our findings show that there was no statistical difference between faculty and recruiters on business intelligence. Interestingly, there was no statistical difference between recruiters and students because the mean rating values for recruiters fell between faculty and students. A potential reason for the difference between faculty and students is that faculty view more skills in business intelligence as being better than fewer skills. Given the more technical skills required to conduct business intelligence and many students' desire to avoid IS's more technical, this is somewhat expected.

System Security

There was no significant difference among the three stakeholders with respect to security issues. Faculty, recruiters and students all deemed system security a worthwhile component of the MIS curriculum. This result is not surprising given that security is a standard tool that all systems/organizations have to develop. Also, because of e-commerce, cloud computing, and so on, security is in the news and at the forefront of society's attention. Interestingly, this is the only topic where all three stakeholders agreed.

System Development

Faculty considered issues such as tools for analysis and design tasks, alternative methods to system design, and recognizing the importance of user-driven design as essential to the makeup of the MIS curriculum. Recruiters and students gave these topics less importance. Similarly to IS infrastructure, students deem this topic to be more technical in nature and, therefore, less deserving of focus in the curriculum. Students and recruiters may consider this topic more worthy in a more advanced class or one that is reserved for computing majors as opposed to all business students (Marshall, et al., 2014). Given the recruiters' focus in this sample, they likely find additional business skills more important than technical skills. Faculty, however, view system development as the IS field's historical foundation and so they tend to feel having more skills in this area is better than fewer.

IS Ethics

While there was no significant difference between how faculty and recruiters viewed the worthiness of ethics in the MIS curriculum, students deemed its value significantly differently from both faculty and recruiters. Students ranked the importance of ethics as higher than the other two stakeholders. This is an interesting finding and is perhaps explained by the rise of the general topic, especially in the areas of computer forensics and accounting forensics.

Table 3: IS Topic Ratings			
Topic	**Faculty**	**Recruiters**	**Students**
IS components	5.732	5.588	5.299
IS in organizations	6.179	5.450	5.584
Globalization	5.92	5.31	5.82
Valuing IS	6.03	5.52	5.31
IS infrastructure	5.919	5.775	5.502
The Internet and WWW	5.801	5.525	6.017
Business intelligence	5.713	5.481	5.455
System security	6.266	6.066	6.172
IS development	6.00	5.49	5.48
IS ethics	5.875	5.669	6.047

Our survey included MIS faculty from numerous universities and our results support the conclusions reached by forty top MIS faculty that Ives et al. (2002) surveyed. More specifically, they concluded that the topics covered in the foundations of IS course are necessary as a foundation for any business field. It is noteworthy that there was agreement between the general MIS faculty population and the top forty scholars in the field.

In summary, taking into account all the MIS curriculum topics, faculty members agreed with recruiters on the importance of IS components, IS infrastructure, and ethics. To faculty and recruiters, having a good grasp of the basics in terms of hardware and software issues, data and data storage requirements, and IT services and support is essential, while the study of ethics was deemed less so. This may be because faculty and recruiters feel that the MIS curriculum is not the appropriate venue for teaching ethics. Faculty members agreed with students on the importance of IT globalization in the MIS curriculum and rated it higher than recruiters. Recruiters and students agreed that there is some value to topics such as IS and the organization, IS valuation, and system development; faculty, however, rank these at a higher level of importance. Interestingly, none of the stakeholders agreed on the importance of the Internet and the WWW, with students rating it highest, followed by faculty and recruiters in that order. Finally, all three stakeholders agreed on the value of system security in the MIS curriculum and rated the topic highly.

VIII. CONCLUSIONS AND RECOMMENDATIONS

It was possible, but unlikely, that all three stakeholder groups would value the content of the foundations in IS course equally. The outcome of this study, however, demonstrates that these stakeholders differ in their opinions on the importance of each topic area. Although some would consider recruiters as a leading authority in what should be taught (because they do the hiring), we should not automatically discount students' opinions. It is important to note that, in the ACM/AIS curriculum evaluation, students were not consulted about the importance of the IS topics. Of course, faculty members are primary to this discussion. We suggest that the academic community and the ACM/AIS curriculum developers review the results above and use them as a springboard to important conversations on the topics IS faculty teach. At some point, necessary changes may be needed to better align the topics with industry needs and, in some cases, to make the topics more appealing to students. In addition, on those topics where recruiters and students agreed, faculty should take care to adequately communicate their importance. Although we do not advocate for major changes in the content of the foundations of IS course and believe that the included topics are elemental to studying MIS (Ives et al., 2002), we do encourage a possible shift in the manner in which the topics are presented. For example, the foundations of IS course could be entirely project based (Frost & Pike, 2004; Marshall et al., 2014), could include a service-learning project component (Ali, DeLorenzo, Memsch, & Kohun, 2008), or could include innovative classroom activities and teaching techniques (Firth, Lawrence, & Looney, 2008). These changes would likely improve the overall perception of importance of the topics for the students.

One of the key findings of our research is that students and recruiters tend to emphasize immediate and short-term needs, while faculty focus increasingly on the long-term view of applying IT. Students are most interested in gaining a skill set that will make them employable and enable them to find a job once they graduate. Similarly, recruiters are concerned that students possess the skill set that they are looking for to fill current open positions in their firm. These skills are typically focused on the entry level. On the other hand, faculty members tend to hold a long-term perspective and consider topics that have more of a strategic focus as being important.

We did expect variances in the level of importance assigned by each of the stakeholders; what is now important is to determine how to reconcile these differences and how to ensure that students and recruiters adopt a long-term perspective of what is being taught in class. Although we understand the stance that students and recruiters adopt, we also see the benefit of incorporating a long-term perspective in classroom discussions. Although the topics that are covered in the foundations of IS course are, as the title implies, foundational, students need to understand that what is being taught are entry-level skills and that, based on these skills, it will be critical to acquire second-order skills to advance in the field and in their career.

Recruiters need to understand that, although they are looking for skills for specific entry-level positions, those individuals that they are hiring today may be the leaders of the company in the future. Therefore, while recruiters may see an immediate need for certain skills, they also need to broaden their perspective and think longer term.

What is important for faculty is to introduce the concepts in the foundations of IS class as the basis for more complex IS topics and how IS plays an important role in any organization. We suggest that faculty members, while covering the topics in the foundations of IS class, ensure that they include a broader approach about to the role and application of IS in business. They can achieve this goal by using brief case studies, incorporating current news topics in the discussion, and addressing more advanced and complex issues that the students might encounter when working. Although, of course, we do not expect students to fully understand these more complex applications of IS at this initial introduction, these topics' importance will be reinforced when the students are subsequently exposed to the same issues in other courses, involved in internships, and even working in their careers.

In this paper, we investigate how faculty, recruiters, and students value the content of the foundations of IS course. IS enrollments have been in decline for years and the value placed on the content by students could be one explanatory factor. Although enrollments seem to have stabilized at some universities and perhaps even grown at others, this is a cyclical problem that continues to plague the field. The results we outline here provide some insight into the importance placed on these topics by each stakeholder group. Because college of business students often choose to major in MIS once they are already enrolled in college (as opposed to computer science majors who are more likely to choose their major while still in high school) (Downey, McGaughey, & Roach, 2009), it is important that their experience with the foundations of IS course be positive and as representative of what an MIS degree (and possible career) would entail.

Moving forward, in order to continually improve our curriculum, all stakeholders should be included in the discussions about how to modify the course's offerings. The idea that all stakeholders need to be consulted reinforces the earlier suggestion by Trauth et al. (1993) that industry and academia need to work closely together to ensure that students are provided the necessary skills and knowledge to be successful professionals.

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

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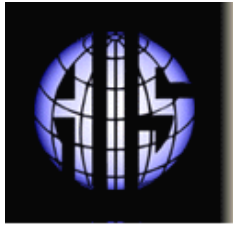
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