

EVALUATING INFORMATION SYSTEMS CURRICULUM

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ABSTRACT

The design/evaluation/redesign cycle for an information system curriculum is neither quick nor easy. The challenges are further compounded for faculty in the Information Systems/Information Technology areas as advancements in technology occur with increasing frequency and speed. While every attempt to maintain a relevant curriculum can be made, processes and resources necessary to change curriculum in academic institutions tend to favor slow and incremental change. The result can be outdated programs that lack relevancy. Model Curriculums have long been published and utilized to both inform and guide professionals in the development of curriculum. The IS 2010 Model has been published by the AIS and ACM and represents the volumes of work and input by faculty members and practitioners/employers. This paper describes the process of implementing curricular change guided in part by the 2010 Model Curriculum.

Keywords: Information Systems, MIS, curriculum, development

INTRODUCTION

How does faculty ensure that the course work being delivered is preparing students for careers in the dynamic and technology driven organizations we experience today? How does faculty choose among the many relevant topics when determining course offerings for the Information Systems (IS) students? The IS curriculum design cycle presents challenges in terms of keeping up with advancing technology and addressing paradigm shifts brought on by expectations from employers (Dowden 2007; Gorgone et al. 2003; Nunamaker Jr. et al. 1982). While every attempt to maintain a relevant curriculum can be made, processes and resources necessary to change curriculum in academic institutions tend to favor slow and incremental change (Davis et al. 1996; Dreher 2009). The result can be outdated programs that lack relevancy.

Model curriculums have long been published and utilized to both inform and guide academic professional in the development of curriculum (Gonzalez et al. 2011; Lynch 2009; Stair and Reynolds 2011). Such models bring together a vast base of current and relevant knowledge of particular professions and offer candidate solutions for curriculum (Henderson 2011; Iyengar 2009). These models are critical to academic institutions desiring to deliver programs that are not only relevant to the local job market but also consistent with the needs on a national and global scale and which address the common body of knowledge in the field (Henderson 2011; Satzinger 2008; Vincent and Focht 2009).

The IS profession, in general, and IS academic programs in particular has been guided by such models since the early 1970s when the ACM Association for Computing Machinery (ACM) and Data Processing Management Association (DPMA), now Association for Information Technology Professionals (AITP), published separate models. IS'97 was the first of these models represented by the joint efforts of the ACM, AITP, and Association for Information Systems (AIS) (Davis, et al., 1997). IS 97 was followed by IS 2002 which included minor updates (Gorgone, et al., 2002). The IS 2010 Model has been published by the AIS and ACM and represents the volumes of work and input by faculty members and practitioners/employers (Topi, et al., 2010).

Despite continued acceptance and use of these model curriculums, very little is known about their implementation methodology. Almost every IS program follows their own strategy on implementing these model curriculums. Sometimes these implementations are slow and sometimes they are incremental. This opens up the model curriculum implementations to be a cause for the very problems that it was designed to address. More specifically, the slow and incremental implementation of the IS Model curriculum could result in an outdated and a chaotic IS program. The goal of this research is to provide an exemplar of one successful implementation of the of model curriculum and detail how it was achieved. This would open up a debate among the researchers and practitioners on developing various implementation strategies that not only guide the IS model implementations, but also highlight the potential pitfalls.

IS 2010

The 2010 model posits three knowledge and skills categories: IS specific, foundational, and domain. While historically, the domain for IS curriculum models has been Colleges or Schools

of Business, The IS 2010 Model Curriculum represents a major departure from previous models as it allows for domains other than business. The idea and popularity of “Informatics” shows one instance of interest and relevance in IS/IT from other domains (Seethamraju 2007; Wagner and Ip 2009). Greenes and Shortliffe (1990) foresaw this emerging relationship and the necessity for curriculum development with substantial growth (see also, Brookshire et al. 2007; Watson et al. 2010). Taking direction from the links forming between different professions and IS, the 2010 model provides guidance for IS programs both inside and outside the business domain.

Some notable changes in the 2010 model include: (1) A core that no longer prescribes application development or personal productivity courses; (2) A new emphasis on courses in enterprise architecture and IS project management; (3) Coverage of data networking and computer architecture. This coverage is prescribed at a higher level of abstraction and suggested as topics to include in a broader course on IT Infrastructure; and (4) Relax prerequisite requirements for various courses.

While application development is no longer a “core course”, the model acknowledges “a strong case can be made for inclusion of programming, computational thinking, data structures, and related material in an IS program” (Topi, et al., 2010, p.27). In fact, the authors note that application development may continue as an offering in most IS programs (see also, Bhatnagar 2009). Topi et al. (2007) also point out the importance of flexibility in reaching non-business IS programs.

IS 2010 states “most institutions require all students to be proficient in personal productivity applications such as word processing, spreadsheets, and presentation software prior to enrolling in any major. Most high schools are preparing students in this area before they reach a higher education environment” (Topi, et al., 2010, p.28). Thus, the recommendation is to eliminate personal productivity courses in an IS curriculum core.

IS 2002 (a previous curriculum model) included both an IT hardware and software course and a course in networking and telecommunications. These courses offered instruction in the area of IT Infrastructure. IS 2010 moves in a different direction, integrating material into an infrastructure course and adding a new course in enterprise architecture (Brown 2009; Callaghan 2011). An infrastructure course would include computer and systems architecture and communication networks but the overall focus is on the services and capabilities that IT infrastructure solutions provide. An enterprise architecture course would focus on organizational level issues that relate to planning, designing, and implementing IT solutions based upon the platforms discussed in an infrastructure course. IS 2010 states “IT Infrastructure covers the core technical foundations whereas Enterprise Architecture provides an integrated organizational perspective to planning and designing institutional solutions” (Topi, et al., 2010, p.28).

The 2010 model is much “flatter” than earlier models including IS 2002. For example, earlier models suggested a prerequisite foundations course prior to any analysis and logical design course (Dowden 2007; Gorgone et al. 2003). There would be a hardware and systems software course as a prerequisite to any networks and telecommunications course. The simplified structure of IS 2010 is much easier on students and does not present as many scheduling “bottlenecks.”

CURRICULAR REDESIGN AT USI

Computer Information Systems (CIS) faculty in the College of Business at the University of Southern Indiana (USI) developed a detailed evaluation and possible redesign of the IS curriculum during the fall semester of 2010. This paper describes the curriculum revision process and includes the redesigned curriculum. The redesign includes considerations from the IS 2010 model curriculum, results from the qualitative analysis of interview data, and results from a quantitative analysis of survey data. These data were collected from students enrolled in IS courses at the university and members of a professional organization associated with the university (IT Alliance).

The AACSB accredited College of Business at USI is located in a modern physical facility on the campus of a growing regional university. In the last decade, the IS program has suffered some decline in numbers as a part of a nationwide trend. However, the decline was not as severe or as lengthy as the national decline and the university is currently experiencing modest growth.

IT ALLIANCE

The Information Technology (IT) Alliance, made up of IT executives from around the university community, has been instrumental in supplying data to the curriculum task force. These executives are responsible for hiring almost all the graduates of the IS program at USI. Therefore, IT alliance formed a key stakeholder for our IS Model curriculum implementation.

Although catering to the job market was our primary motive, we also wanted to involve members of the IT alliance to better understand current market trends. IS model curriculum implementations can be slow and incremental resulting in outdated programs. So, it is important that these curriculum changes are implemented swiftly. Despite this motivation, logistical issues in implementing the changes recommended by the model curriculum may slow the implementation process. One strategy to circumvent these problems is to prioritize the changes in the IS programs. IS departments can expend more energy on implementing changes that are considered very critical by the IS executives. These IS executives understand the ever-changing IT market trends and can help prioritize the changes. With high gain changes implemented relatively quickly, it is very likely that the IS programs will stay current and relevant.

STUDENT SURVEYS

Students form a very important section of stakeholders that IS departments often fail to include while implementing changes in their IS curriculum. Several seminal papers in marketing and even IS research have highlighted the role of developing products and service that would appeal to the market. One way to determine such appeal is either to test the actual products with a sample of the market or to conduct discussions via focus groups.

Involving students in the IS Model curriculum implementation is very critical because they help establish the relevance of the IS curriculum. Students are interested in learning courses that they think are not only current, but also relevant to what they experience in their day-to-day life. These students, when surveyed collectively, could help highlight areas in the curriculum that needs major changes. Given that the IS departments find it hard to make significant changes

very quickly, students act as a great resource helping IS departments determine what changes would have the maximum impact.

MEASUREMENT AND RESULTS

In order to pursue our IS Model curriculum implementation strategy, we collected formal and informal data from both our stakeholders—i.e., members of the IT Alliance and the students.

Over the course of a year, members of the IT Alliance participated in personal interviews and discussions informing the task force about necessary skills and abilities for potential employees. While their data generally supported the model curriculum, this group was critical in communicating employment needs for local businesses. Feedback from the IT Alliance suggests a need for “*problem solvers*,” and “*communicators*”. These two skills correlate directly with the section “*Foundational Knowledge and Skills*” in the IS 2010 model curriculum and more specifically with the section labeled “Oral and Written Communication and Analytical and Critical Thinking”. The feedback further suggests a preference for employees with at least introductory knowledge in application development. While the IS model curriculum suggests many programs will include application development, such a course is not recommended as a required course for every program.

Informal data gathering techniques included classroom discussions and interviews with executives, faculty, and student advisees. The initial qualitative data led to the development of a questionnaire which suggested possible curriculum improvements into tracks. Three tracks were identified consisting of: Enterprise Web Development, Enterprise Application Development, and Information Systems Management. Work on a cross-discipline minor with collaborations from the business college, the college of language arts, and the graphic arts department provided the foundation for a track in web development. Several meetings of the IS faculty, to discuss the qualitative data at hand, led to the inclusion of two more tracks on the survey. The business college at this university houses a computer programming department. As a part of collaboration between the IS department and the computer science department, technical skills deemed important by the IT Alliance, local businesses, and the IS 2010 model curriculum suggested a programming track would be an important consideration. Finally, in keeping with recommendations from the IS model curriculum and qualitative data from MIS professors. The IS management track stood out as an opportunity to include coursework more in keeping with a traditional MIS program.

Student surveys were developed to find out where student interest would be strongest (An example of the survey can be found in Appendix A). Students were supplied with a definition of each track and ideas about the courses that would be included in each track. Students were then asked to indicate their preferences among these tracks with respect to (1) desirability, (2) importance of tracks to current job market, (3) importance of tracks to future job market, and (4) likelihood of choosing. (e.g. Would you enroll in this major/track?).

Students from different business majors were surveyed. Some students had not declared a major while some had declared business majors outside of CIS. Overall, students were surveyed from a variety of majors including computer information systems (CIS), business management, finance, and accounting. The rationale for including a variety of majors was to evaluate a broader

perspective, not just that internal to the CIS program. A total of 89 surveys were completed. With respect to the CIS majors, it was important to determine which tracks (if any) were attractive to these students. Because students often enroll in business courses (business college core) before actually deciding upon a particular major, it was also necessary to gather the opinion of business majors that had not declared a major in CIS.

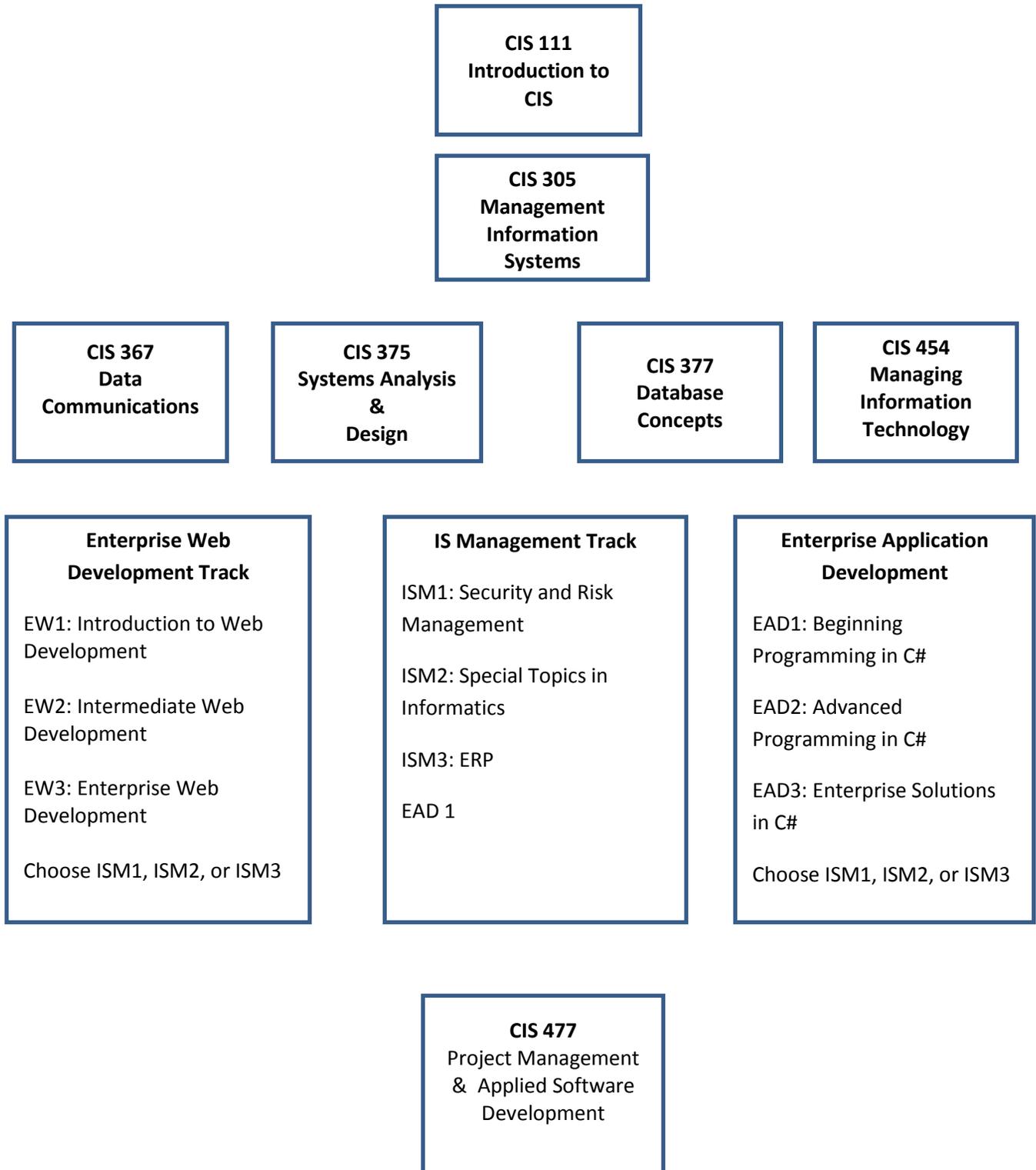
The results suggest students are both interested in and likely to enroll in an Enterprise Web Development Track or an IS Management Track. There was less interest shown in the Enterprise Application Development Track. These results were consistent amongst most majors with the exception of Computer Science (CS). CS majors, as expected, favored the programming track (Computer Science is housed within the College of Business on this campus, and CS students take some CIS courses).

The redesigned curriculum represents a major change in the USI IS program. The most remarkable change centers on the offering of tracks. Many of our students seek local jobs. The regional area of Southern Indiana has a moderate concentration of health care firms, banking and financial firms, and manufacturing firms. Offering tracks allows students to concentrate in areas more directly related to each of these career possibilities. At the same time, the redesigned curriculum reflects the essence of the IS 2010 Model. It is our expectation that this aligns the students well with the needs of employers with IS jobs at the broader national, and even global levels.

CONCLUSION

Rapid advances in technology make it imperative for faculty to revisit the Information Systems curriculum. This need has been further exacerbated by dropping enrollments in Information Systems programs across the country. In this paper, we present an exemplar of revisiting IS curriculum based on the IS model 2010 curriculum. Based on discussions with community business members and data from student surveys, we found that differences between Computer Science and Information Systems are becoming more distinct. Moreover, Information Systems students prefer Enterprise Web Development and IS Management over Enterprise Application Development whereas Computer Science students prefer Enterprise Application Development over Enterprise Web Development and IS Management. This is in line with the 2010 model that no longer prescribes application development or personal productivity courses and places more emphasis on courses in enterprise architecture and IS project management. Further studies are still needed to examine if these findings are generalizable. Perhaps, understanding the deeper role of economy is another aspect that might help us better prepare for the development of future IS curriculum.

Figure 1: Revised Curriculum



APPENDIX

CIS Curriculum Student Survey

The CIS faculty at USI is looking into expanding the curriculum for CIS students giving you some options for your coursework. These options would come in the form of distinct tracks allowing each student to choose a 'focus' for their educational path.

We would greatly appreciate it if you would take a few minutes to look over this information regarding some proposed tracks for the CIS curriculum and answer the survey questions which follow.

Your help with this survey will provide valuable feedback which can shape the CIS program for future students. It is our goal to continually improve the experience you get from USI as students and increase the value placed on a CIS degree earned from USI. By taking a few moments now you are helping your university accomplish both tasks.

CIS Curriculum with Tracks Proposal

The CIS core curriculum

The CIS curriculum will have a required core similar to that which is currently in place. Core courses and track courses may be taken in parallel where any prerequisites have been met. The core will include the following courses:

- Introduction to CIS
- Adv. Microcomputer Applications (in business core)
- Mgmt Info Systems
- Data Communications
- Systems Analysis and Design
- Database Concepts
- Managing IT
- Applied Senior Project

Tracks

Students will choose one track for focusing coursework toward a specific topic area within the CIS domain. Each track will include 12 hours of coursework. Tracks will be composed of related course topics. The following are proposals for courses making up 3 possible tracks:

Track A - IT Management:

- IT Ethics and security
- Ethical use of information systems/data; securing information and systems
- Informatics
- Using the flow of data to design information systems which augment or evolve business processes
- eBusiness and Web 2.0
- Using the internet to augment or redesign business processes; considerations for the role of social networking and other Web 2.0 components in business
- Programming language I (from programming track)
- Choice of C# or Java

Track B – Programming:

- Programming language I
- Choice of C# or Java
- Programming language II
- Choice of C# or Java
- Enterprise application development
- Use of advanced programming techniques to solve business problems
- eBusiness and Web 2.0 (from mgmt track)

Track C – Enterprise Web Development:

Introduction to web development

This course has a cross disciplinary focus covering all aspects of web development – technical, graphical, content, and management

Intermediate web development

This is a comprehensive introduction to programming tools and skills needed to construct web applications.

Enterprise web development

This course focuses on a popular web development platform and expands its use to include databases, server side development, and web server builds

eBusiness and Web 2.0 (from mgmt track)

Questions:

What is your current major? _____

On a scale of 0 to 10 please rate how desirable you find each of the proposed tracks for the CIS major:

	Not at all Desirable										Highly Desirable											
Track A	0	1	2	3	4	5	6	7	8	9	10	0	1	2	3	4	5	6	7	8	9	10
Track B	0	1	2	3	4	5	6	7	8	9	10	0	1	2	3	4	5	6	7	8	9	10
Track C	0	1	2	3	4	5	6	7	8	9	10	0	1	2	3	4	5	6	7	8	9	10

On a scale of 0 to 10 how relevant do you feel these tracks are to the current job market?

	Not at all Relevant										Highly Relevant											
Track A	0	1	2	3	4	5	6	7	8	9	10	0	1	2	3	4	5	6	7	8	9	10
Track B	0	1	2	3	4	5	6	7	8	9	10	0	1	2	3	4	5	6	7	8	9	10
Track C	0	1	2	3	4	5	6	7	8	9	10	0	1	2	3	4	5	6	7	8	9	10

On a scale of 0 to 10 how relevant do you feel these tracks are to the future job market?

	Not at all Relevant										Highly Relevant											
Track A	0	1	2	3	4	5	6	7	8	9	10	0	1	2	3	4	5	6	7	8	9	10
Track B	0	1	2	3	4	5	6	7	8	9	10	0	1	2	3	4	5	6	7	8	9	10
Track C	0	1	2	3	4	5	6	7	8	9	10	0	1	2	3	4	5	6	7	8	9	10

If you were choosing a track to pursue toward a CIS major degree today, which track would you choose?

Track A	Track B	Track C	None of these
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Please comment on any changes you would make to each of the proposed tracks:

Changes I would make to track A are: _____

Changes I would make to track B are: _____

Changes I would make to track C are: _____

Is there a subject area for a track not listed here that you might propose? _____ If yes, please describe: _____

Thank you for supporting the betterment of your University

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