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In this issue:

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# Advancing Local Degree Programs Using the IS Model Curriculum

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## Abstract

Several options exist for faculty endeavoring to enhance and advance an Information Systems (IS) program. For two decades, one liberal arts college has offered, maintained and advanced an Information Systems program emphasizing the IS'90, IS'97 and IS'2002 model curricula. Endeavoring to maintain a balance between business, technical and interpersonal skills, the faculty has created a Bachelors of Science Degree in Computer Information Systems (CIS). The positive results from recent involvement in the Institute for Certification of Computing Professionals (ICCP) core examination and testing of the students currently enrolled in this program confirm that the faculty has succeeded in creating a strong and viable program. Faculty commitment to continuous improvement and a coordinated effort to cover the learning objectives of the IS model curricula have advanced this degree program. Using a model curriculum while committing to continuous improvement facilitates the creation and maintenance of strong IS degree programs.

**Keywords:** curriculum, national information system curriculum models, development of academic program, assessment

## 1. INTRODUCTION

Information systems can be taught by many departments with varying names including: Information Technology, Informatics, Computer Information Systems, Management Information Systems, Computer Science, Management, and Engineering. The schools that teach IS may include technical, liberal arts, and business. No matter what the classification of school or name of the department, IS curricula models play a pivotal role in the revision of curricula and courses. Other factors that may influence the curricula are accreditation issues, requirements of the business community, unique environmental issues and instructor expertise and interest. IS curriculum models enable aca-

demic communities to maintain programs that are consistent with the needs of the business community and the body of IS knowledge. Additionally, they provide standard information for administrative awareness regarding course offerings and resources needed for a viable program, including computing hardware, software, laboratories and personnel. Those who hire students graduating from programs following a curriculum model have a better understanding and appreciation for each student's knowledge base.

Since the earliest days of Information Systems education, faculty and practitioners have created, examined and evaluated curricula. A variety of models for various com-

puting disciplines have evolved over this period of time. One model curriculum is IS 2002, a joint effort by ACM, AIS and AITP. (Gorgone et al. 2002) This is a model curriculum for undergraduate degree programs in Information Systems that uses previous versions including IS'97. (Davis et al., 1997) DAMA/IRMA 2000 is an Information Resource model curriculum. The IEEE/ACM Computing Curricula 2001 provides guidelines for undergraduate programs in computing, including Information Systems. Following any one of these model curricula can be beneficial to the faculty, business community and students.

Close working relationships with the business community can enhance the course offerings at schools. Internship programs provide this opportunity for many undergraduate students. Their work experience during their undergraduate degree program often leads to more job offers and better salaries.

Accreditation of IS programs is another way to validate and improve the information system curriculum. There are primarily two processes of accreditation that impact information systems curriculum. First, schools and departments of management are concerned with achieving and maintaining AACSB [<http://www.aacsb.edu>] accreditation. Second is the new information systems accreditation conducted by the Computing Accreditation Commission (CAC) of the Accreditation Board for Engineering and Technology (ABET) [<http://cis.bentley.edu/isa/pages/accreditation.html>] which is accrediting IS programs. The latter accreditation is geared towards the approximately 50% of IS programs located outside of management and business schools. Pace University is one of the first programs to gain this accreditation. Accreditation is used to differentiate programs and is often highlighted in program and institutional marketing endeavors.

A degree in Information Systems, Computer Information Systems or Management Information Systems has been highly sought by employers. The demand for such graduates will likely grow. In fact, according to a June, 2003, article in the *Washington Post*, programs that mix business with technical training will soon be facing a resurgent demand for graduates. (McCarthy, 2003) The de-

velopment of a program to meet the demand in CIS first requires a determination of how to assess graduate success.

First we must establish the goal of education: a model graduate. Such model should specify attitudes, skills and body of knowledge necessary to perform work professionally meeting needs of employer. Curriculum may only be designed on such a foundation. (Kuras, et al., 1999)

The IS model curriculum (Davis et al., 1997; Gorgone, 2002) provides a list of skills and a body of knowledge that can be used in curriculum development. With the support of the IS model curriculum, a degree program was successfully proposed, developed, implemented and improved.

This report shows how the CIS program at Mesa State College was adapted to meet the IS'97 course structure with an eye to advancements in model curriculum, and with continual efforts to improve the curriculum. A brief history of the evolution of the CIS program is presented. Faculty involvement and commitment to using the model curriculum are explained, along with details that might make this program unique. Advantages of using a model curriculum are presented. Future possibilities for this program are explored.

## 2. HISTORY OF ONE PROGRAM

Mesa State College, a liberal arts college with approximately 5500 students, has offered a Bachelor of Science (BS) Degree in Computer Information Systems (CIS) since 2000. Earlier, the school offered a Bachelor of Business Administration (BBA) Degree with an Emphasis in Business Computer Information Systems (as early as 1980). In the 1970's a two-year program in data processing, primarily designed to produce COBOL programmers, was part of the school's offerings. The CIS Curriculum at Mesa State College has changed substantially in the past thirteen years.

In 1990, the BBA -CIS Emphasis Program clearly reflected its evolution from a two-year data processing program. It was heavily concentrated in courses taken in the first two years. Students completing the BBA

Program were required to take five one-hour freshman level courses in CIS: Computer Literacy, Business Computer Concepts, Basic Programming, COBOL Programming I, and Intro to Business Software. They then took two three-hour sophomore-level CIS courses: Advanced Business Software and COBOL Programming II. Required junior level CIS courses included only one course called "Computers in Management". Finally, as seniors, students completed a systems analysis and design course and a management information systems course. One elective was available in CIS at the senior level: Database Administration. Required Business courses included three accounting courses, an introduction to business course, two business law courses, two economics courses, principles of management, principles of marketing, business policies, quantitative decision making, and two business electives.

The curriculum for the BBA Degree was modified slightly in the early 1990s, based on the IS'90 model curricula developed through DPMA (Longenecker and Feinstein, 1991). The Management Information Systems course was moved to a junior level, taking the place of the Computers in Management Course. An advanced CIS course was added at the senior level: Seminar in Information Systems. By 1995 the Database Administration course was required and the second COBOL course was no longer part of the curriculum. A networking/telecommunications course was taught as an elective in the Spring of 1996.

In 1999, the emphasis moved further from lower-division courses to upper-division ones. The freshmen-level CIS courses were mostly combined into a single Business Information Technology course. One accounting course and one business law course were dropped from the business support courses required. Students were required to take a Visual BASIC Programming Course; and a sophomore level course called "Fundamentals of Information Systems" was added based on the IS'97 Model Curriculum. (Davis et al., 1997).

When the BS Degree in CIS was implemented in 2000, with rough equivalents to the courses described in the IS'97 model, the major CIS requirements were as follows:

Computer Information Systems Core  
 CSCI 110 Beginning Programming: Visual BASIC  
 CISB 201 Fundamentals of Information Systems (IS'97.1)  
 CISB 205 Advanced Business Software (IS'97.2)  
 CISB 131 COBOL Programming (IS'97.5)  
 ELCT 260 Information Technology, Hardware and Software (IS'97.4)  
 CISB 392 Information Systems Theory and Practice (IS'97.3)  
 CISB 400 Data Communications and Network Management (IS'97.6)  
 CISB 442 Systems Analysis and Design (IS'97.7 and IS'97.10)  
 CISB 451 Database Administration (IS'97.8 and IS'97.10)  
 CISB 471 Advanced Information Systems (IS'97.9 and IS'97.10)

Business Support Courses  
 Accounting (two courses- Financial and Managerial)  
 Business Law  
 Macro- and Micro-Economics  
 Managerial Finance  
 Principles of Management  
 Principles of Marketing  
 Quantitative Decision Making  
 Business Policy and Management

Students were still required to take business statistics and business calculus. Additionally students had to take several electives, some of which had to be upper division. CIS majors were especially encouraged to participate in supervised internships during their junior or senior years.

### **3. INVOLVEMENT AND COMMITMENT TO A MODEL CURRICULUM**

During the same time period as the curriculum evolution, the local faculty was involved in AITP (formerly DPMA). A student chapter of DPMA began in 1987. At least one faculty member each semester has maintained membership in DPMA or AITP. Since 1987, faculty members have attended ISECON, presented papers or have been involved in EDSIG. Students and the faculty advisor have attended all but two of the National Computing Conferences. This involvement lead to an interest in the IS'90 and subsequent curriculum models.

Several faculty members began studying the model and comparing it to the current local curriculum. Every effort was made to attend ISECON, especially to attend model curriculum sessions. Papers related to the model curriculum were read, and faculty also wrote and presented papers related to curriculum issues.

During the Spring Semester of 2003, our faculty was asked to participate in a workshop related to the IS'2002 Model Curriculum. One faculty member would be required to attend three workshops. One goal of the workshop group was to update the ICCP (Institute for Certification of Computer Professionals) core exam for Information Systems using the learning units of the model curriculum. Students at participating institutions would be allowed to complete a beta version of the exam at no charge. The results of the exam would be provided to faculty for analysis. Our faculty found this advantageous for three reasons:

1. Our bachelors of science in CIS had begun two years earlier and this would be a way to assess our students and the new program. Budget constraints had made it difficult to find a way to assess our graduating seniors and now an exam would be available without charge.
2. Involvement in this process would allow the faculty to evaluate the new program and continue improving the degree program.
3. Work done in these workshops would allow the faculty to map our courses to the model curriculum and move the program one step closer to accreditation.

One faculty member attended the initial IS 2002 Workshop in Mobile, Alabama, at the end of February. At this workshop, the model curriculum courses 2002.6-2002.10 (Gorgone et al., 2002) were used to create objectives and exam questions that matched learning units. With this initial effort, ICCP representatives constructed a 110 question exam. Only 100 of the questions were scored.

On April 11 and 12, students at our institution completed the on-line ICCP core exam. Five different sessions were set up and two

weeks prior to the exam, students were required to sign up for one of the sessions. Seniors, juniors and sophomores were all enlisted to take the exam. Students were reminded in class and with electronic mail. Two faculty members, not including the workshop participant, proctored the exam. A few technical difficulties were encountered but mostly the exam sessions went smoothly.

Forty-nine students completed the exam. In the past to pass the ICCP core exam, a student would need to score 50 out of 100. The average score for the students was 54.96 while the national average was 51.83 (n = 530). Reviewing the students who completed the exam, true seniors (those who had completed all the courses in the core) had an average score of 58. This result was encouraging to the faculty. It appears to confirm that the local curriculum matches the learning units of the model curriculum.

Using the IS'97 model curriculum was beneficial to the implementation and evolution of the local curriculum. It was possible to implement a CIS curriculum that emphasized the learning units from the model curriculum in a span of three years. Based on the model curriculum, a fourth CIS faculty position was created and filled. The faculty requested and was granted a laboratory that is being supported by administration. State-wide approval was granted for this new program. The model curriculum was cited as one reason the program was approved.

#### **4. UNIQUE FACTORS IN OUR PROGRAM**

Using a model curriculum can be beneficial for the process of program changes, and suggestions about implementation (Becker et al., 1992) may assist with making these changes. Local issues may also play a large role in the implementation while resource issues can negatively affect the process. The curriculum for the BS- CIS Program at Mesa State College is uniquely influenced by several key factors.

- The program has its roots in a BBA program. The number and type of business support courses required in the program reflects an ongoing commitment to a business emphasis.

- The program is continually required to contrast itself with the Computer Science Program provided at Mesa State College. Courses are designed to avoid redundancy with Computer Science courses, and to emphasize different topics and skill sets than those courses.
  - The program particularly emphasizes interpersonal and communication skills. Faculty who teach in the CIS Department consistently integrate writing, speaking, critical analysis, ethics, and teamwork into their courses.
  - The program is designed for selective admission of students, based on required coursework, GPA, and faculty approval for admission into the Program.
  - The program includes some courses that must also serve as service courses for other programs. The Advanced Business Software Course provides an example of this situation. The course does not exactly meet any of the courses in the model curriculum, but it can be used to meet several of the learning objectives and it must continue to be taught as a service course for other programs in the School of Business and Professional Studies.
  - The program faculty are able to work with faculty from other programs on campus to provide some of the required courses. For example, the learning objectives of the 'IS02.4' Curriculum Area may be met through having students take a course that is part of a two-year telecommunications degree taught in the electronics area. Courses taught by business faculty can be useful for business support courses, and to cover topics like project management. Computer science faculty can help out through teaching supplemental programming and web design courses. In exchange, the CIS faculty can provide technology courses that students across campus will take, ethics and business information systems topics that computer science students will take, business software courses that telecommunications majors might need, and business information courses for business and accounting majors to take.
  - The program has access to laboratory classrooms for specific courses, and even to one lab that can be used for implementing student networks.
  - The program is situated in a favorable location for students to participate in internships, field trips, and community based projects. At approximately 50,000 in population, Grand Junction provides a variety of businesses and governmental entities that can serve as advisors and provide enhanced educational opportunities.
- What may appear to be a disadvantage of a small liberal arts program may actually prove advantageous. With only four faculty members, collaboration and communication are enhanced. Faculty determination and commitment have overcome financial resource constraints. Extra time and effort of committed faculty members have made the curriculum revisions possible. Often faculty members have shared travel money to assure a presence at critical curriculum presentations. Faculty members also took positions on key college and state committees to facilitate approval of local curriculum changes. Communication and a strong congenial atmosphere contributed to the accomplishments in creating, proposing, and implementing this successful IS degree program.

## **5. THE FUTURE AND RECOMMENDATIONS**

Further changes are currently being made on the curriculum based on the 2002 updated model. The Fundamentals Course will be numbered as CISB 210, requiring the Advanced Business Software course as a prerequisite. Students can then be expected to be proficient in the advanced use of spreadsheets and database software before taking

the class. Additionally, an electronic business strategy course will be taught by CIS faculty beginning in spring, 2004. At some point it may be useful to add a professional responsibility workshop similar to the one described in an article by Peter Denning (Denning, 2001). The described workshop would provide for students and faculty to explore various professional responsibility and ethics issues in greater depth than is possible in the current program. CIS Faculty are in the process of mapping specific courses to the learning units of the IS'2002 model curriculum. This mapping may indicate further changes that should be made to the local curriculum.

The faculty plans to use the accreditation standards to continue to improve this program. Now that the IS curriculum is in place and there are graduates from the program, the college plans to seek IS accreditation. This process will allow the faculty additional ways to evaluate and to improve the program.

After the experiences and success of an IS program in a liberal arts school, using an IS model curriculum is highly recommended. The creation and implementation of the program were improved by using the IS'97 model. Inclusion of the model in program documentation was vital to the approval of the BS-CIS program at both the college and the state level. With additional research and improvements being provided in IS'2002, local curricula will be revisited. This faculty's experience in program development using this model curriculum has been positive.

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