

IS'2001: Progress Report on Updating IS'97

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Abstract

We discuss the updating process for the IS'97 IS curriculum guidelines and accreditation, the first pilot visit to occur this fall. Course descriptions for the proposed IS'2001 curriculum are provided with a description of scope and a high-level set of topics for each course. Lastly, the primary conclusions of a research survey based on IS'97 is presented. It is noteworthy that IS faculty primarily train IS analysts who have demonstrated expertise in database applications, their skill set matches the expectations of the computing industry, the skill areas of IT programs match the expectation of IS faculty, and model courses P0, 1 and 2 could be revised.

Keywords: Information systems, model curriculum, IS education

Introduction

Information Systems undergraduate curriculum models have received attention for the past two decades. The most recent model IS'97 (Davis et al 1997) was circulated in draft form in 1995 (Longenecker, et al 1995) with much of the work being completed in 1994. Thus it has been approximately seven years since a close look at IS curriculum has taken place. This paper will be a preliminary report on the primary issues being considered on an effort funded by ACM, AIS and AITP to update IS'97.

After IS'97: ISCC and MSIS

Since the publication of IS'97, two other significant projects regarding similar curricular areas have been published. Lidtke and Mulder (1999) led an NSF sponsored task force in the development of an undergraduate Information Systems Centric Curriculum (ISCC). Gorgone and Gray (2000) lead a team in the development of a masters curriculum (MSIS 2000). Both of these models have been published and have been widely presented at national meetings for the benefit of Information Systems faculty.

IS Accreditation and IS'97

There has been interest in the accreditation of programs in Information Systems since the accreditation of programs in computer science was begun in the 1980s. The work on IS'97 with its support from all of the major IS professional societies provided much needed catalyst for

IS accreditation to move forward. With the support of the National Science Foundation Criteria for the Accreditation of Programs in Information Systems have been developed. ABET is the agency with responsibility for accrediting all programs in computing, engineering and technology. The Computing Accreditation Commission (CAC) has responsibility for the responsibility for accrediting computer science and information systems. The first pilot visit will take place this fall.

Research based on IS'97

Recently a survey of computing faculty in the United States has been conducted to ascertain information on two areas. The first was to determine their current view of the appropriate depth of mastery for each of the elements in the IS'97 body of knowledge. The second was to gather similar information for key skill areas identified within IS'97. Some of the observation of this research have been published (Longenecker, et al 2000; Landry et al 2000). The primary conclusions are summarized as:

1. IS faculty primarily train IS Analysts
2. IS Analysts have the capability to develop database applications. They have specific skills at IS'97 skill depth level 3 (the ability to *USE* knowledge) in the areas of Interpersonal and Team Skills, Business Knowledge, Organizational Process Development (including IS Systems Analysis and Design), Project Management, Database, Software Development, Web Programming, and Systems Integration.

3. The skills identified in IS'97 as the Exit Curriculum Areas and Sub areas match the expectations of the computing industry as well as IS faculty.
4. The skill areas produced by programs of Information Technology match the expectation of Information Systems faculty.
5. Computer Science and Software Engineering exit skill areas match very closely, and also match the skill areas required for training application developers. However, there is a large discrepancy between IS/IT and CS/SE demands; rather, there is little similarity in desired skill depths.
6. The model courses of IS'97 are acceptable. However, model courses P0, 1, and 2 could use some revision.

The Internet Revolution and IS'97

During the writing of IS'97 it was possible to anticipate the utility of Web programming. Specific reference was made to thin-client programming concepts. It was known at that time that the impact of this then novel concept was enormous, but was at the time unrealized. In the intervening years the Internet has grown to be a major player in IS environments. It seems obvious that there has been a fundamental shift in direction in society with no reverse course possible.

Information Systems 2001

In conceptualizing the role of information systems in the future it seems apparent that several elements remain unchanged:

1. IS is a systems discipline
2. IS is about the application of information technology in organizational settings
3. IS enables the success of organizations
4. IS professionals must be problem solvers
5. IS is frequently of strategic significance because of the scope of organization systems involved
6. IS is involved in organizations from the operations to the Board Room
7. IS is inextricably woven into the fabric of organizational processes
8. IS may be the organizational process, or aspects of it
9. IS consists of people, procedures, machines, software and data
10. IS focuses on the application of information technology in helping people achieve their goals, wherein organizational productivity is the desired result, and where people are the focus
11. IS requires skills of Interpersonal and Team, Business Principles, Organizational / Interorganizational Process Development (including

IS Systems Analysis and Design), Project Management, Database, Software Development, Web Programming, and Systems Integration.

Development of IS'2001

From the survey data it appears that IS'2001 will be a minimal update to. The following elements of IS'97 will be updated during the process:

1. Courses. IS'2001.P0,1, and 2 will be modified as shown in the course list below.
2. The Computing Body of Knowledge (updates from EC Institute, ACM-CS)
3. Several Learning Units
4. Many figures

Courses of IS'2001

The IS'01 curriculum assumes two levels of prerequisite knowledge of desktop computing. The first level is elementary exposure to a suite of software applications useful for knowledge workers such as word processing, spreadsheets, Email, and Internet browsing. The second level of prerequisite knowledge is described as IS'01.P0.

The prerequisite Personal Productivity with IS Technology (IS'01.P0) course plus the ten IS courses are described by a title, scope, and topic list.

IS'01.P0 – Personal Productivity with IS Technology (Prerequisite: elementary knowledge of word processing, spreadsheets, Email, and Internet browsing)

SCOPE This prerequisite course enables students to improve their skills as knowledge workers. The emphasis is on personal productivity concepts through using functions and features in computer software such as databases, presentation graphics, and Web authoring. Although identified as a course, this material can be delivered as self-study modules, as modules associated with other courses using the software, or as a full course.

TOPICS Knowledge work productivity concepts; advanced software functionality to support personal and group productivity such as templates and macros; reuse rather than build from scratch; organization and management of data (sorting, filtering) via spreadsheets and database tools; accessing organization and external data; information search strategies; tool use optimization and personalization; professional document design; Web page design and publishing; effective presentation design and delivery.

IS'01.1 – Fundamentals of Information Systems (Prerequisite: IS'01.P0)

SCOPE This course provides an introduction to systems and development concepts, information technology, and application software. It explains how information is used in organizations and how IT enables improvement in quality, timeliness, and competitive advantage.

TOPICS Systems concepts; system components and relationships; cost/value and quality of information; competitive advantage and information; specification, design and re-engineering of information systems; application versus system software; package software solutions; procedural versus non-procedural programming languages; object oriented design; database features, functions, and architecture; networks and telecommunication systems and applications; characteristics of IS professionals and IS career paths. Practical exercises may include developing macros, designing and implementing user interfaces and reports; developing a solution using database software.

IS'01.2 – Electronic Business Strategy, Architecture and Design (Prerequisite: IS'01.1)

SCOPE This course examines the linkage of organizational strategy and electronic methods of delivering products, services and exchanges in inter-organizational, national, and global environments. Information technology strategy and technological solutions for enabling effective business processes within and between organizations in a global environment are considered.

TOPICS Electronic economics, business models, value chain analysis, technology architectures for electronic business, supply chain management, consumer behavior within electronic environments, legal and ethical issues, information privacy and security, transborder dataflows, information accuracy and error handling, disaster planning and recovery, solution planning, implementation and rollout, site design, Internet standards and methods, design of solutions for Consumer Internets, Intranets and Extranets, EDI, payment systems, support for inbound and outbound logistics.

IS'01.3 – Information Systems Theory and Practice (Prerequisite: IS'01.1)

SCOPE This course provides an understanding of organizational systems, planning, and decision process, and how information is used for decision support in organizations. It covers quality and decision theory, information theory, and practice essential for providing viable information to the organization. It outlines the con-

cepts of IS for competitive advantage, data as a resource, IS and IT planning and implementation, change and project management.

TOPICS Systems theory and concepts; information systems and organizational system; decision support; quality; level of systems: strategic, tactical and operational; system components and relationships; information system strategies; roles of information and information technology; roles of people using, developing and managing systems; IS planning and change management; human-computer interface; IS development process; evaluation of system performance; societal and ethical issues related to information systems design and use.

IS'01.4 – Information Technology Hardware and System Software (Prerequisite: IS'01.1)

SCOPE This course provides the hardware / system software fundamentals for various computer / network architectures used in the design, development and implementation of contemporary information systems. These concepts enable systems development personnel to explain tradeoffs in computer architecture for effective design. System architecture for single user, central, and networked computing systems; single and multiuser operating systems.

TOPICS Hardware: CPU architecture, memory, registers, addressing modes, busses, instruction sets, multi processors versus single processors; peripheral devices: hard disks, CDs, video display monitors, device controllers, input/output; operating systems functions and types; operating system modules: processes, process management, memory and file system management; examples and contrasts of hardware architectures, operating systems, basic network components and telecommunication devices for the implementation of information systems.

IS'01.5 – Programming, Data, File and Object Structures (Prerequisite: IS'01.1)

SCOPE This course provides an exposure to algorithm development, programming, computer concepts and the design and application of data and file structures. It includes the use of logical and physical structures for both programs and data.

TOPICS Data structures and representation: characters, records, files, multimedia; precision of data; information representation, organization and storage; algorithm development; programming control structures; program correctness, verification, and validation; file structures and representation. Programming in traditional and visual development environments that incorporate event driven, object-oriented design.

IS'01.6 – Networks and Telecommunication (Prerequisite: IS'01.4)

SCOPE This course provides an in-depth knowledge of data communications and networking requirements including networking and telecommunications technologies, hardware, and software. Emphasis is upon the analysis and design of networking applications in organizations. Management of telecommunications networks, cost-benefit analysis, and evaluation of connectivity options are also covered. Students learn to evaluate, select, and implement different communication options within an organization.

TOPICS Telecommunication configurations; network and Web applications; distributed systems; wired and wireless architectures, topologies and protocols; installation, configuration and operation of bridges, routers, switches and gateways; network performance tuning; privacy, security, firewalls, reliability; installation and configuration of LAN and WAN networks; monitoring of networks; management of telecommunications, and communications standards.

IS'01.7 – Analysis and Logical Design (Prerequisite: IS'01.1)

SCOPE This course examines the system development and modification process. It emphasizes the factors for effective communication and integration with users and user systems. It encourages interpersonal skill development with clients, users, team members, and others associated with development, operation and maintenance of the system. Structured and object oriented analysis and design, use of modeling tools, adherence to methodological life cycle and project management standards.

TOPICS Life cycle phases: requirements determination, logical design, physical design and implementation planning; interpersonal skills, interviewing, presentation skills; group dynamics; risk and feasibility analysis; group-based approaches: project management, joint application development (JAD), structured walk-throughs; structured versus object oriented methodologies; prototyping; database design; software package evaluation, acquisition, and integration; global and inter-organizational issues and system integration; professional code of ethics.

IS'01.8 – Physical Design and Implementation with DBMS (Prerequisite: IS'01.5 and IS'01.7)

SCOPE This course covers information systems design and implementation within a database management system environment. Students will demonstrate their mastery of the design process acquired in earlier courses by designing and constructing a physical system using database software to implement the logical design.

TOPICS Conceptual, logical and physical data models and modeling tools; structured and object design approaches; models for databases: relational, hierarchical, networked and object oriented; design tools; data dictionaries, repositories, warehousing and data mining; database implementation including user interface and reports; multi-tier planning and implementation; data conversion and post implementation review.

IS'01.9 – Physical Design and Implementation in Emerging Environments (Prerequisites: IS'01.2 and IS'01.8)

SCOPE This course covers physical design and implementation of information systems applications. Implementation in emerging distributed computing environments using traditional and contemporary development environments.

TOPICS Selection of development environments and standards; software construction: structured, event driven and object oriented application design; testing; software quality assurance; system implementation; user training; system delivery; post implementation review; configuration management; maintenance. Multi-tier architectures and client independent design.

IS'01.10 – Project Management and Practice (Prerequisite: IS'01.7)

SCOPE This course covers the factors necessary for successful management of information systems development or enhancement projects. Both technical and behavioral aspects of project management are applied within the context of an information systems development project.

TOPICS Managing the system life cycle: requirements determination, design, implementation; system and database integration issues; network management; project tracking, metrics, and system performance evaluation; managing expectations of managers, clients, team members and others; determining skill requirements and staffing; cost-effectiveness analysis; reporting and presentation techniques; management of behavioral and technical aspects of the project; change management. Software tools for project tracking and monitoring. Team collaboration techniques and tools.

References

- Couger, J. Daniel, Herbert E. Longenecker, Jr., David L. Feinstein, Gordon B. Davis, John T. Gorgone, Dorothy Dologite, George M. Kasper, Joyce C. Little, Joseph S. Valacich and A. Milton Jenkins. 1995. "Information Systems 1995", MISQ Fall 1995.
- Couger, J. Daniel, Gordon B. Davis, David L. Feinstein, John T. Gorgone, and Herbert E. Longenecker, Jr. 1997. "IS '97: Model Curriculum and Guidelines for Undergraduate Degree Programs in Information Systems, Data Base Volume 26 Number 1 Winter 1997, pp. I-94.
- Davis, G. B., Gorgone, J. T., Couger, J. D., Feinstein, D. L., and Longenecker, H. E. Jr. 1997. "IS '97 Model Curriculum and Guidelines for Undergraduate Degree Programs in Information Systems," ACM, New York, NY and AITP (formerly DPMA), Park Ridge, IL.
- Gorgone, J. T. And P. Gray 2000. "MSIS 2000: Model Curriculum and Guidelines for Graduate Degree Programs in Information Systems", Database Vol. 31 No. 1, Winter 2000, p1-48.
- Gorgone, J.T. and Lidtke, D. 2001. "IS Accreditation", www.csab.org
- Landry, Jeffrey P., Longenecker, Herbert E. Jr., Haigood, Brandon, and Feinstein, David L., "Comparing Entry-Level Skill Depths Across Information Systems Job Types: Perceptions of IS Faculty," Americas Conference on Information Systems (AMCIS 2000), August 2000.
- Lidtke, D. and Mulder 2000. "Information Systems Centric Curriculum", www.iscc.unomaha.edu
- Longenecker, H. E., Feinstein, D. L., Couger, J. D., Davis, G. B., and Gorgone, J. T. "Information Systems '95: A Summary of the Collaborative IS Curriculum Specification of the Joint DPMA, ACM, AIS Task Force," Journal of Information Systems Education (6:4) 1994, pp174-186.
- Longenecker, Herbert E. Jr., David L. Feinstein, J. Daniel Couger, Gordon B. Davis, and John T. Gorgone 1995. "IS'95: Information Systems '95--The Joint DPMA, ACM and AIS Curriculum for Four-Year Undergraduate Programs of Information Systems".
- Longenecker, Herbert E. Jr., Feinstein, David L., Haigood, Brandon, and Landry, Jeffrey P., 2000. "IS'2000: On Updating the IS'97 Model Curriculum for Undergraduate Pro-grams of Information Systems," Journal of Information Systems Education (JISE), Vol. 10, No. 2.