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December 2004

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ABSTRACT

Smaller undergraduate colleges that offer degrees in Information Systems (IS) and also provide general purpose computing instruction have to reconcile competing demands upon curriculum design. This paper presents one response to IS2002 Model Curriculum in the context of the maturing of the Information Technology field. It presents a model for a course for IS majors and general business students that includes an introduction to databases, the web, and database driven websites. As the course has recently been adopted, the evaluation component discusses both formative and summative evaluation based upon locally developed instruments.

Keywords

Information systems core course content, undergraduate business programs, information fluency, IS2002 curriculum.

CONTEXT FOR CURRICULA DEVELOPMENT

Although the focus of this paper is on a recent course revision at an undergraduate school of business at a small (4000 full time enrollment, 600 undergraduate business school enrollment), private university, curriculum development in computing has been an evolutionary process. Computing instruction has followed waves which represent the maturing of the discipline and reflect commercial developments in computer technology. As an expression of its maturity, the discipline had developed three curricula models by the early eighties in Computer Information Systems (Data Processing Managers Association (DPMA) Curriculum '81), Computer Science (Association for Computing Machinery (ACM) Curriculum '78) and Computer Engineering (CE) (Institute of Electrical and Electronics Engineers (IEEE) CE '76). Similarly in its ties to commercial developments, introducing computing to undergraduates changed markedly during the microcomputer or PC revolution of the eighties and nineties. This development reached a temporary stasis about 1995 with the domination of the Microsoft Windows and Intel processing chip (WINTEL) architecture, the stabilization of the Windows interface, and the development of the Microsoft Office Suite. This shift also represented the transition from computing languages developed in academia, such as *Beginner's All-purpose Symbolic Instruction Code* (BASIC) used to introduce computing (Kemeny, 1985), to a focus on applications and uses of computing for disciplinary content in fields outside computing.

Coincidently, IS'97, the first collaborative curriculum model between ACM, Association for Information Systems (AIS), and Association of Information Technology Professionals (AITP) (formerly DPMA), echoed this consolidation and defined an updated model curriculum for IS undergraduates. This curriculum introduced the notion of "knowledge work software kit" and "personal productivity" and argued for a level of computer literacy as an expectation of all students. At about the same time, the National Academies began examining the place of computing in the curriculum resulting in the National Research Council Report (1999) which developed the notion of computer fluency.

As the focus for instruction in computing moved from those disciplines defined by computers, such as Computer Science (CS), Computer Engineering (CE), and Computer Information Systems (CIS), a tension developed between teaching to understand the discipline and instruction to provide a service. This stress is common in mature foundational disciplines, such as English and Mathematics, where discipline and service courses vie for resources. The developing tension regarding computing instruction is especially evident in undergraduate schools of business because today's digital tools—computers, the web, and databases—are the tools of 21st century business. Consequently, computing becomes utility knowledge in

disciplines such as marketing, accounting, finance, and management. Faculty members in those disciplines expect their students to have learned the basics of computing elsewhere so they can focus on disciplinary practices and theory. The need for service courses may also be exacerbated when the business school becomes, or is perceived as, the location for general purpose introductory computing courses as may happen in a smaller university where general purpose computing investments in a school of business may be higher than in other schools on campus.

LOCAL ENVIRONMENT

In our particular case, the business program has required two computing courses since the late eighties. The first microcomputer course to gain acceptance focused on using spreadsheets. Introduced in the early nineties to replace a required programming course, the scope of this course has broadened as students have arrived with basic familiarity and now focuses increasingly on data analysis with spreadsheets. This transition follows the development of the increased power of the spreadsheet. The course introduces elementary statistical concepts, data analysis with pivot tables, and more sophisticated business modeling including creating macros. The second required course, introduced in the late nineties, again to replace a required programming course, was designed to meet the demand for familiarity with software tools and introduced students to word processing, databases, presentation software, the internet and e-mail.

In this required sequence, one course focused on quantitative analysis and the other on the personal productivity tools. Both courses were taught in teaching labs, with individual workstations and small class sizes. These courses also formed the only general computing introduction on campus, in contrast to the computer aided design (CAD) courses offered in Engineering, or the more senior statistics courses using statistical packages offered in Arts and Sciences. Consequently, these courses attracted students from outside the school of business. These two introductory courses grew to approximately half the sections offered each semester by the CIS department as enrollment and demand increased.

Current State

Since 2001, experienced faculty had noted more students arriving with basic familiarity with the productivity suites, especially presentation and word processing software. Some faculty had adjusted their courses to introduce more web centered technologies such as hypertext markup language (HTML) but those changes had not been formalized. One faculty member had informally surveyed her classes using a publisher provided practice Microsoft Office Specialist (MOUS) exam and found more than 85% were able to pass a skills test on Word and PowerPoint. In another informal locally prepared survey, students ranked the importance and challenge of designing a database or web page highest and presentation software the lowest among the sections presented in the original course. With the promulgation of IS2002 (Gorgone et. al. 2002) and a shift in the university administration to ask departments and schools to define computer fluency for their areas, the faculty of the school of business, led by the CIS faculty, reexamined the computing requirements.

The parameters required the CIS faculty to work within the framework of the business core which all students complete by the beginning of their junior year. This prevented developing a course similar to Schatzberg's (2003) integrative capstone experience. Additionally, there have been recent pressures to reduce the computing courses to a single course, most notably as a result of the ethical lapses in business such as Enron, World Com and Martha Stewart, and the suggestion of additional ethics courses.

The purpose and content of the spreadsheet course remained unchallenged, largely because many students need exposure to quantitative analysis. The course introduces basic accounting, finance, or economic concepts through examples and students learn formal presentation of business data, such as a balance sheet. On the other hand, the productivity course obviously needed revision or its place in the curriculum would be cannibalized. In Summer 2003 faculty redesigned the course. Two faculty members, an adjunct and a full time faculty member, piloted the course in Fall 2003. The course was then modified and adopted for all sections in Spring 2004. This course became the local response to the changes suggested for IS2002.P0 in the IS2002 curriculum to account for the importance of the internet and increases in student computer literacy (Gorgone, 2002. p. 5.)

COURSE DESCRIPTION

The technologies necessary to conduct business via the internet form the central focus of the redesigned course. There are four sections to the course: introduction to the internet, introduction to relational databases, basic HTML, and combining databases and the web in web driven databases.

The first section introduces topics such as web architecture (client/server models), email components (Post Office Protocol (POP) and Simple Mail Transport Protocol (SMTP)), domain names, file transfer protocol (FTP), hypertext transfer protocol
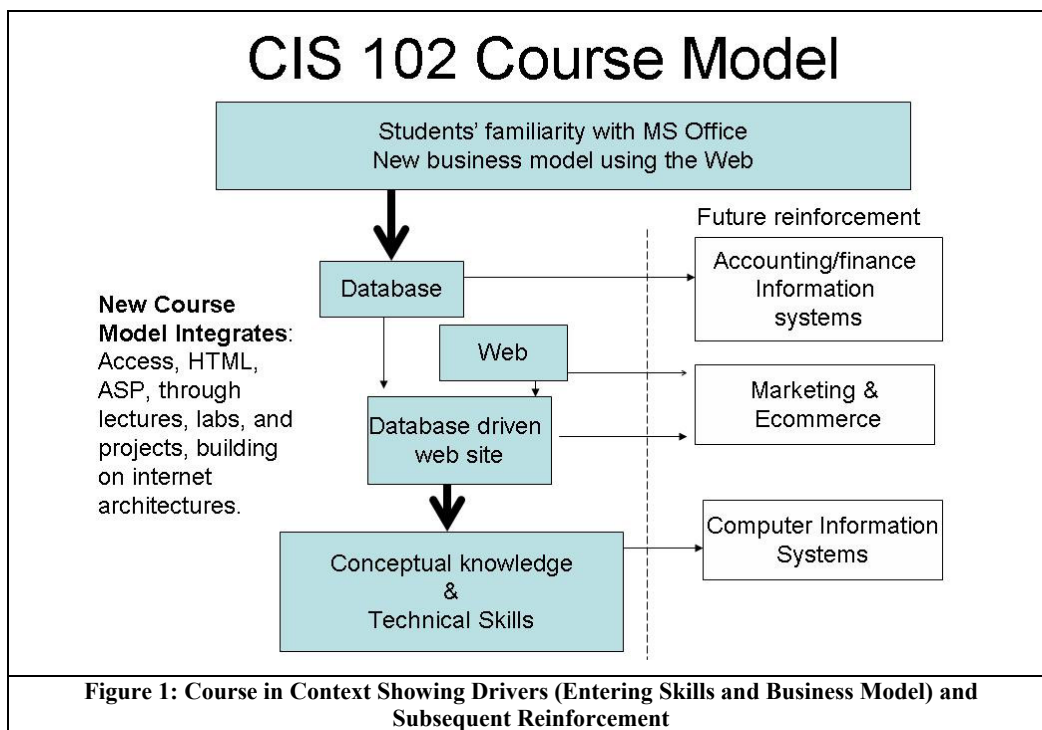
(HTTP), local and wide area networks. At the end of this section, students have a basic understanding of how computers connect to the outside world and how they can sit at home and access worldwide web sites or send email to their friends.

The next segment of the course presents students with basic database concepts used in today's business environments. The students are guided through a real-world database assignment where they design a relational database and populate it with *bona fide* data collected from their peers. The students then create queries, forms, and reports on data that they have collected themselves which gives added importance to the project.

Following a brief introduction to HTML, the final instructional section covers the technologies needed to build a professional database driven web site. The students explore HTML and build their first web site using a simple editor such as Notepad. A brief overview of a basic scripting language introduces rudimentary programming and database connectivity concepts. Coupled with the SQL commands learned in the database section, the students know components necessary to add interactive elements such as a guestbook or order form to a website.

The course culminates in a student designed project that is presented to the class. In the past, faculty who had introduced the web had students build a simple web site hosted by the university. In the new model students may elect a web site, a database, or a database driven web site as a project. Interestingly, and contrary to faculty expectations, in the Fall 2003 pilot, students developed projects in each category.

At the end of the course, students leave with a broad understanding of the technologies needed to conduct business via the web, which is the paradigm for 21st century business transactions. These skills are subsequently reinforced in their upper division disciplinary courses as diagramed in Figure 1. For example, the Accounting Information Systems course and the upper division Financial Services courses build upon the database skills, just as the Marketing and E-commerce courses build upon the web and database integration components.

Figure 1: Course in Context Showing Drivers (Entering Skills and Business Model) and Subsequent Reinforcement

It should be noted that the course design, with its introduction to database, web site design and deployment, and web driven databases, is possible because of maturing technology. Within the WINTEL environment, the inclusion of Internet Information Server (IIS) within Windows XP allows students to develop and test on a local machine. This both reduces course support and better mirrors the development cycle of real world programmers. Final deployment may be to a university or department host.

COURSE EVALUATION

There are two components to the course evaluation, formative and summative. As the course has recently been adopted, the focus to date has been on formative evaluation. Following Flagg (1990), these measures are less obtrusive and better fit the current emphasis on continuous improvement.

In the process of determining course content and emphasis, the faculty examined offerings by regional peer institutions through catalogue descriptions and interviews with colleagues. The observations indicate that the revisions of IS2002 have yet to be implemented. Most institutions have a single introductory course, often coupled with a self-paced or minimally credited (usually 1 credit) functional skills program. In addition, interviews with regional employers have informed the content. This is especially valuable for understanding the needs of the general business student rather than the CIS major. The interesting finding from these interviews has been the increased importance of database technologies. While Davis and Olson (1985) note the centrality of database systems, it is only recently, with the almost wholesale adoption of personal computers, that smaller businesses now have access to technology that had formerly been limited to large enterprises.

The formative evaluation has been primarily from observations by CIS faculty who were familiar with the goals but who had not taught the revised course. Assignments and projects have been reviewed with a critical focus on the model detailed by Davis (1999) where he identified three aspects of knowledge work productivity: increased efficiency, increased effectiveness, and expansion and/or conservation of time and attention to activities. The course design, which takes students from database concepts and implementation through data collection and analysis via the web, demonstrates the efficiency, effectiveness, and conservation of time. It especially echoes the observations of Zuboff (1988) who identified changes in business practices, when data collection and analysis become embedded in routine activities.

With adoption in Spring 2004, there are six sections being taught by four instructors, which gives a large enough pool of students and sufficient variety in faculty beyond those teaching the pilot to assess the course. The evaluation, using locally prepared questions, examines two areas: the students' attitudes towards learning these technologies and the students' conceptual understanding. The evaluation reinforces the course concepts because it is implemented as an interactive web site whose responses are written to a database. The central focus of the conceptual questions will be to determine whether first and second year students can understand the complex technologies that blend the web and databases in a business context. This requires a more sophisticated appreciation of the technology than we have attempted before. Appendix 1 has screen shots of selected questions from the survey and the conceptual area.

The further development of the summative evaluation involves faculty teaching the upper division courses. For example, the CIS program requires students to complete a database course just as the Accounting program requires an AIS course with a significant database design component. The faculty in these courses will be assessing the skill sets the students bring to the course differently with this revised introductory offering. The design team for the course is particularly interested in whether students with a more sophisticated technology background grounded in business practice will begin to influence the approaches and scope by faculty outside CIS. Most importantly for the CIS faculty will be the students some two to three years hence in the capstone CIS course, *Senior Software Project*, where students work with a client to design a system. This course has increasingly focused on the role that the web plays in business because of the demands of the clients.

As the current program, consistent with the school's mission, is a pragmatic mix of theory and practice, faculty in the program are evaluate the quality and type of student projects. These projects represent the application of course material by the students to novel situations. While faculty expect that the majority of students will elect to develop a web site as they have in the past, the alternatives of the database or web driven database for the more confident students make for a richer educational experience for all students.

CONCLUSION

Our analysis to date has been based upon a pilot completed in the Fall 2003 semester; consequently, it has been used to refine the course for implementation in the Spring 2004 semester. The major change was the pacing and ordering. The pilot course design emphasized a looping structure beginning with HTML, moving to the database, and returning to HTML and Structured Query Language (SQL) for the data driven web site. This, however, was dissatisfying so has been modified to introduce the database then build the HTML to incorporate scripting for the database. Student response has been surprising, with unanticipated positive responses from students who have indicated CIS as a major.

With adoption of the course in the Spring 2004 semester, the authors expect to be able to present data at the conference from the semester's end which better evaluates the course. The authors expect this new course design meets the goal from Ives et. al. (2002) of providing students "…distinct and essential expertise about information systems use, development, integration and management…" more effectively than prior offerings.

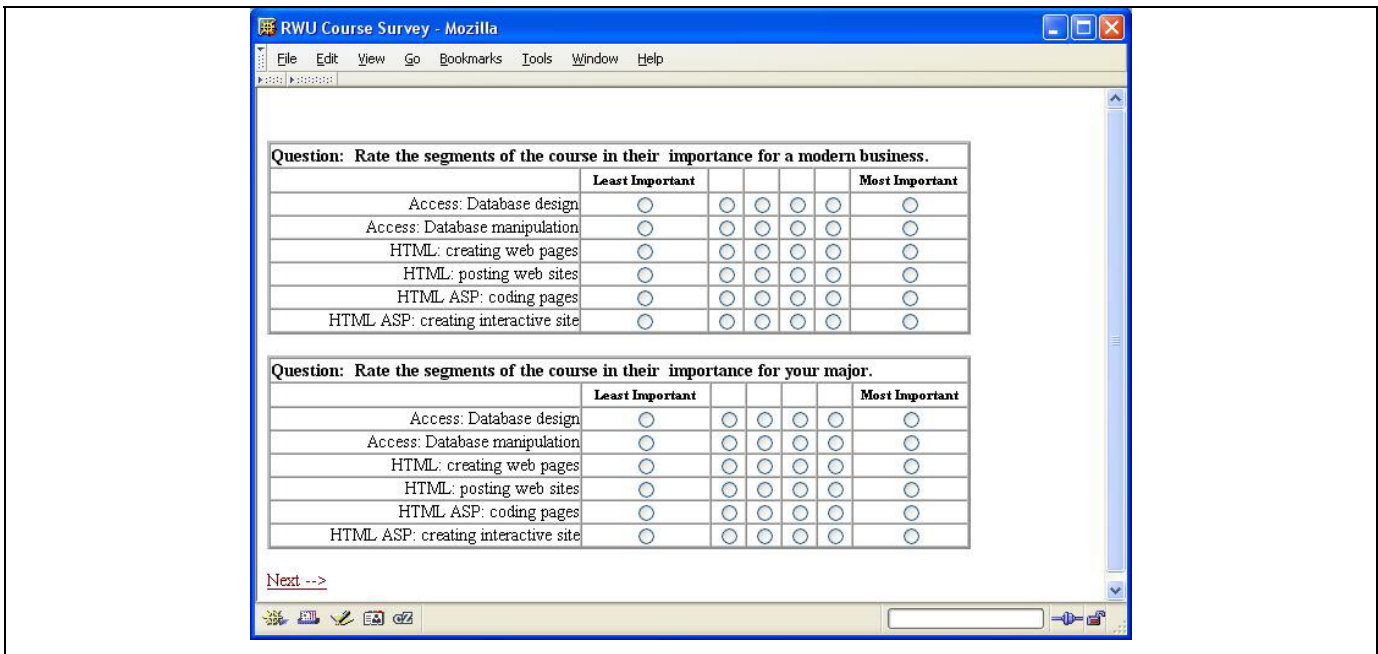**APPENDIX 1 SCREEN SHOTS OF QUESTIONNAIRES**

Figure 2: Sample Attitudinal Survey Questions Presented as an Interactive Website
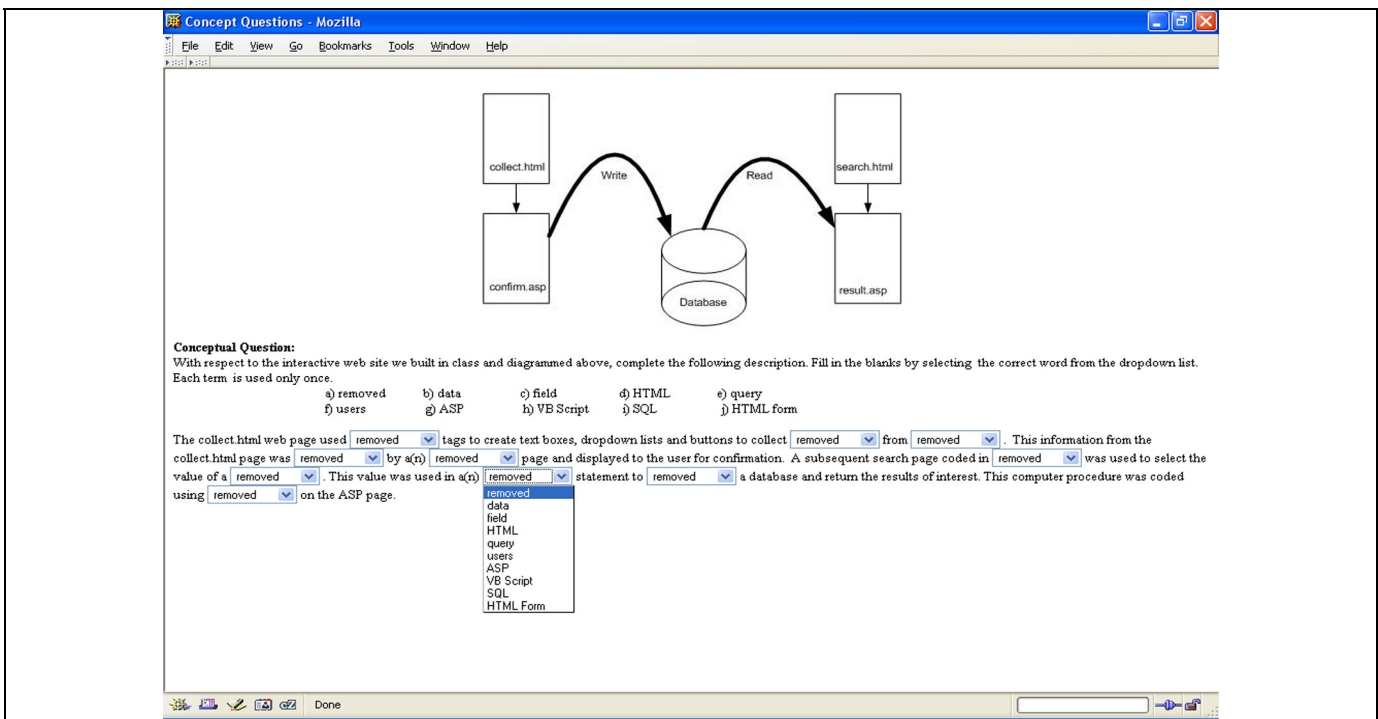

Figure 3: Sample Conceptual Survey Question Presented as an Interactive Website

REFERENCES

1. IEEE (1977) A Curriculum in Computer Science and Engineering, Long Beach, CA: IEEE Computer Society.

2. Austing, R. H., Barnes, B. H., Bonnette, D. T., Engel, G. L., Stokes, G., (1979) Curriculum '78: recommendations for the undergraduate program in computer science— a report of the ACM curriculum committee on computer science, Communications of the ACM, v.22 n.3, p.147-166

3. Davis, G. B., Olsen, M. H. (1985) Management Information Systems: Conceptual Foundations, Structure, and Development (2nd Ed.) New York, NY: McGraw-Hill.

4. Davis, G. B., Naumann, J. D., Allen, G. (1999) Developing an Teaching IS'97.2: Personal Productivity with Information Technology. CAIS, Vol 1, 17.

5. Flagg, B. (1990) Formative Evaluation for Educational Technologies, Hillsdale, NJ: Lawrence Erlbaum.

6. Gorgone, J. T., Davis, G. B.,Valacich, J. S. Heikki, T., Feinstein, D. L. Longenecker, H. E. (2002) IS2002 Model Curriculum and Guidelines for Undergraduate Degree Programs in Information Systems, Communications of the Association for Information Systems or http://192.254.222.212:8009/IS2002Doc/Main_Frame.htm

7. Ives, B. et. al. (2002) What Every Business Student Needs to Know about Information Systems. CAIS, 9, pp 467-477.

8. Kemeny, J. G.; Kurtz, T. E. (1985). *Back To BASIC -- The History, Corruption, and Future of the Language.* Reading, MA, Addison Wesley Publishing

9. National Research Council (U.S.) Committee on Information Technology Literacy. (1999). Being Fluent With Information Technology. Washington, DC: National Academy Press.

10. Schatzberg (2003). A Capstone Introductory IS Course: Strengthening Coverage of IS2002.1 and Disentangling IT from IS2002.p0. Information Systems Education Journal, 1 (1). http://isedj.org/1/1/. ISSN: 1545-679X. (Also appears in *The Proceedings of ISECON 2003: §2421.* ISSN: 1542-7382.)

11. Zuboff, S., (1988)*. In the Age of the Smart Machine: The Future of Work and Power, New York, NY: Basic Books