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An Interdisciplinary Undergraduate Degree Program in Electronic Commerce

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Abstract

This paper describes an innovative curriculum for an interdisciplinary undergraduate degree program in electronic commerce. Faculty from the disciplines of computer information systems, computer science, operations management, marketing and graphic design collaborated in devising a curriculum that focuses on the business of electronic commerce while providing a solid base of information technology skills. The program includes an integrated junior year experience that gives students business and technical skills in a team-taught environment. During the senior year, students concentrate on technology infrastructure, business processes, or market analysis and development. This paper not only presents a blueprint for an undergraduate curriculum, but also provides a model for faculty cooperation across academic disciplines.

Background

During fall semester 1998, marketing faculty in the College of Business at a large comprehensive university began discussing ways to further develop the Strategic Internet Marketing course. The faculty quickly recognized that their goals could not be accomplished in a single course, but rather would have to be met over several courses. This led directly to the idea of creating an electronic commerce major that would focus on the business processes involved in conducting commerce on the Internet. The faculty also realized that offering an e-commerce major as they envisioned it was beyond the capabilities that the marketing program, or even the College of Business, could offer.

Specifically, the marketing faculty envisioned a major that would produce informed and savvy practitioners of various Internet technologies, including graphic design, and who are firmly grounded in the goals and processes of business. They began talks with colleagues from computer science, graphic arts and information security who had expertise in areas in which the marketing program was lacking. Marketing also invited representatives from other business disciplines such as computer information systems, finance, and operations management. With the approval of the deans of the various colleges involved, this *ad hoc* group committed to the development of an e-commerce major and began developing a interdisciplinary curriculum.

The guiding vision for the curriculum was to produce students who will understand the business fundamentals drawn from accounting, finance, management, marketing, and operations. We wanted students to think in terms of business models; specifically, to answer these questions: What is the value that business organizations provide? How do business organizations deliver that value so that it meets customer needs and wants; generates revenues, produce profits, and increase shareholder wealth; and functionally integrates information technology, marketing and other business disciplines across the firm? We also wanted students to be able to monitor, measure, and control the implementation of the organizational strategies that support e-commerce. Students would also develop strong information technology skills. These skills would be focused on meeting the business objectives described above and applied for the strategic advantage of the firm in an interactive, e-commerce environment. Finally, the curriculum would be integrative in nature and emphasize theory, application, and experiential learning and incorporate rapidly changing technologies to prepare students for life after their university education.

Advisory Committee

The faculty committee developing the e-commerce major worked closely with e-commerce professionals. Members of the industry advisory committee include chief executive officers, partners or senior managers from the following firms: Advanced Software Applications, Andersen Consulting, ClubComputer.com, Computer Sciences Corporation, Ernst & Young LLP, KPMG LLP, and Oracle Corporation.

This industry committee provided input during the development of the curriculum, and then critiqued the curriculum and assisted in its revision. Some members of the advisory committee donated software and hardware resources to support the program. Based on input from the advisory committee, many of our initial proposals were revised, some were eliminated, and others were added.

Learning Objectives

The faculty members and industry advisors developed the following learning objectives. Upon graduation with a major in e-commerce, students will able to design, create, and maintain intranet and/or Internet sites that add value to the organization by increasing its

strategic effectiveness. Specifically, they will be able to do the following:

1. develop and maintain the technological infrastructures that permit e-commerce,

2. design appropriate interfaces between the technology infrastructure and the customer,

3. understand privacy, security, and ethical issues surrounding e-commerce,

4. manage and analyze vast amounts of primary and secondary data,

5. develop business by finding new customers and driving them to the e-commerce site, and

6. effectively manage supply chains and the order fulfillment process.

Building on these learning objectives, students will be prepared to meet the demands of employers. Each of the six learning objectives are expanded below to indicate how students are prepared to enter the job market.

Develop and maintain the technology infrastructure that enables e-commerce. Upon graduating with a degree in e-commerce, students will be able to

1. establish, maintain, and manage information technology to support e-commerce,

2. maintain computer systems and networks,

3. develop and implement procedures for host and network security,

4. gain a working knowledge of security packages, and

5. evaluate and select software tools for electronic commerce.

Design appropriate interfaces between the technology infrastructure and the customer. Upon completion of the e-commerce major, students will be able to

1. integrate databases and other back office technologies of e-commerce with input from consumers visiting the web site,

2. create Internet sites that are both user friendly and efficient, and

3. manage the entire Internet presence of the firm.

Understand privacy, security, and ethical issues surrounding e-commerce. Graduates with a major in e-commerce will be able to

1. respond to changing challenges in computer and data security,

2. create privacy protections and anticipate legally and ethically defensible privacy statements,

3. use ethical business strategies that protect consumer privacy, and

4. understand legal issues surrounding electronic commerce in different countries and jurisdictions.

Manage and analyze primary and secondary data. Upon completion of the e-commerce major, students will be able to

1. use database management applications in database marketing,

2. perform and use customer lifetime value analysis to assess customer profitability,

3. identify, differentiate, and employ various methods used to acquire information, such as company and commercial databases, environmental scanning, and market research,

4. differentiate among and use various survey methodologies and explain the advantages and disadvantages of each method.

Develop business by finding new customers and driving them to the e-commerce site. Graduates with a major in e-commerce will be able to

1. identify, select, and implement appropriate online business models for competing in a global environment,

2. monitor and analyze web traffic logs, click-through rates, conversion statistics, etc.,

3. design and create online advertising content (e.g., banners, buttons, interstitials, newsletters, etc.) using various software tools (e.g., Photoshop, Listserv), and

4. drive targeted traffic to the web site using appropriate online and offline strategies.

Effectively manage supply chains and order fulfillment processes. Upon completion of the e-commerce major, students are able to

1. effectively manage inventory, warehousing, and distribution strategies,

2. analyze and design supply chain systems, with particular respect to information flow, and

3. assess performance and continually improve the order fulfillment process.

Curriculum and Concentrations within the E-Commerce Major

The proposed degree program is a BS degree in electronic commerce. The major will require 120 semester credits over four years. Students will be required to meet current university general education requirements and complete a common body of required core courses in e-commerce areas prior to applying for admission to the e-commerce major. This model is similar to the Bachelor of Business Administration degree requirements currently in place at the university and other peer institutions. After being accepted into the program, students will complete their junior year, fulfill a summer internship, and complete their senior year. The program will be limited to 800 students, or 200 each of freshmen, sophomores, juniors, and seniors.

During the freshman and sophomore years, students enroll in general education and foundation business courses. All e-commerce students will complete the same core courses as traditional business majors, with two exceptions. Instead of taking business law, they take an introductory course in graphic design. They also take an introductory programming class.

During the junior year, students will enroll in a 21-credit, two-semester functional systems course. This team-taught experience introduces the e-commerce major to the significant topics in e-commerce from the marketing, finance, operations, management, design, security, international, and programming perspectives. During this 21-hour course, students develop a business plan for an e-commerce venture they create, build a presence on the Internet, grow that presence through appropriate business strategies, and take the business global. At the end of this course, students have a basic understanding of all the major issues needed to start, run, and manage an e-commerce business.

The course provides them with all of the necessary tools to succeed in the internship they are required to take between the junior and senior years, and is the foundation upon which to build during their senior year. Students are exposed to general information from each of the three concentrations in the major, allowing them to make an informed decision about which track to pursue. Perhaps the greatest benefit of the integrated course is its holistic view of e-commerce. Students learn how information technology can and must mesh with the goals and processes of the business world.

Also during the junior year, students continue taking general education courses as well as an advanced Internet programming course. During the summer between the junior and senior years, all students are expected to complete a summer internship. The experiential learning that occurs during an internship not only provides students with a taste of the professional business world, but also helps prepare them for their senior capstone year in the e-commerce major.

During the senior year, students continue meeting university general education requirements. Additionally, students enroll in a web management course in which they learn about and exercise skills required in managing a web site for an e-commerce enterprise. All students also enroll in a senior seminar course and a capstone course. The senior seminar discusses the latest theories and trends emerging in e-commerce, and is offered during the last semester of the students' senior year to help them learn current thinking and prepare them for emerging technologies when they graduate. The capstone course will either be a business experience (e.g., running their own e-commerce business) or a senior project in which they will be expected to integrate what they have learned.

The majority of the senior year, however, will be spent pursuing one of three concentrations within the e-commerce major: technology infrastructure, business processes, or market analysis and development. Each one of these concentrations will provide greater exposure to concepts to which the students were exposed during their junior year. Each is described below.

Technology Infrastructure Concentration

The technology infrastructure concentration prepares students to understand, evaluate, and manipulate technologies relevant to e-commerce. Upon completion, the students are able to participate with other experts in e-commerce in recommending strategic input of these technologies, and/or in implementing and managing the technology infrastructure for e-commerce. Students get instruction in the following areas:

1. Communications/Networking

   - LAN/WAN, internetworking
   - Switches, bridges, routers, etc.
   - Network management
   - Network protocol standards (relevant to e-commerce)

2. Operating Systems

   - Process management, memory management, storage management, etc.
   - Windows NT, Linux, etc.

3. Information Security

   - Security of data and their exchange
   - Host security
   - Network security
   - Exposure to and working knowledge of security packages

4. Object Management Technologies

- Architecture and implementation of distributed systems
- Middleware technology and standards
- Object-oriented technologies
- Relational database management systems (rdbms)

Concentration in Business Processes

This concentration focuses on the internal business processes required for e-commerce. It includes areas such as order fulfillment, trade partner relationship management, the analysis and design of systems, the evaluation of system performance, and the technology required to support these processes. Students will get instruction in the following areas:

1. Materials Management

- Inventory management
- Warehousing strategy
- Distribution strategy
- Facilities strategy
- Purchasing management

2. Analysis and Design of Supply Chain Systems

- Information requirements
- Information flow management
- Data structures
- Information integrity
- Analysis and design methods

3. Software Tools for Supply Chain Information Flow

- Software evaluation
- Selection/RFP process
- Evaluation of build vs. buy decisions
- Outsourcing and vendor relationships

4. Performance Measurement

- Metrics
- Data collection and review
- Mathematical modeling tools
- Software tools
- Methods for continuous improvement

Concentration in Market Analysis and Development

Students graduating with this concentration will be able to use Internet technologies, processes, and services to acquire, analyze, and interpret business information and to actively manage and coordinate interactions between customers and the firm. Students will get course work in the following areas:

1. Market Research

- Using Internet-Based Methods to Acquire Business Information
- Gathering and Analyzing Personal, Environmental, Customer, and Competitor Intelligence
- Qualitative and Quantitative Market Research Techniques

2. Customer Acquisition

- Analyzing and monitoring web traffic, click-through rates, conversion statistics, etc.
- Online and offline advertising methods
- Strategies for driving traffic to the site
- Online advertising content
- Software tools

3. Data Mining and Modeling

- Customer retention using existing customer data
- Model building and analytical techniques
- Market segmentation, product development, pricing, promotional strategies and product distribution

4. Customer Relationship Management

- Interactions between customers and brands
- Customer acquisition, retention, and migration
- Integrating customer knowledge throughout the firm
- Managing customer relationships

The interdisciplinary faculty committee preferred to avoid attaching the objectives and content of the degree program to existing courses at the university. Instead, faculty teaching in the program will be free to work together to devise new courses that integrate the material without regard to departmental or discipline boundaries. Although the curriculum is constrained to require no more than 15 credit hours per semester, the faculty did not require that courses be developed in 3 credit-hour blocks. Rather, credit hours will be assigned based on the requirements of the particular courses.

Conclusion

This paper has described an innovative undergraduate curriculum in electronic commerce. It is interdisciplinary, involving training in the fields of computer science, graphic design, the functional areas of business, information systems, and marketing as well as specialized e-commerce topics. It was developed by a faculty team composed of colleagues from a number of fields, and

advised by a group of e-commerce professionals. The curriculum features a team-taught experience in the junior year that introduces students to business and e-commerce concepts in an integrated environment. In the final year, students concentrate on technology infrastructure, business processes, or market analysis and development. This curriculum provides students with the broad business background and technical skills to be successful practitioners of commerce in the electronic environment of the 21st century.

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