

A Practical Approach for Implementing E-Commerce Programs in Business Schools

Ignoring the 'e' component in business education does a great disservice to students preparing for a career in business.



E-commerce is dramatically changing the way businesses operate. In fact, e-commerce typically accounts for savings of 5%–10% or more in the cost of doing business and yields marketplace advantages for all large and small companies that engage in e-commerce [5].

Recent statistics showcase the e-commerce market explosion. Business-to-business (B2B) e-commerce is currently a \$100 billion market with expectations of \$3 trillion in four years [3]. Furthermore, at least 1,400 software companies are currently competing to sell B2B systems [7]. In addition, by 2004 there will be one billion cell phones worldwide, and half of them will be Internet-enabled, which will further strengthen the e-commerce wave [1].

DeLoitte Consulting indicated in a *U.S. News and World Report* article that 91% of U.S. businesses conducted Internet transactions in 2001, up from about 30% in 2000. As a result, total B2B e-commerce sales are projected to reach a stunning \$1.5 trillion by 2004 compared with about \$104 billion in 1999 [6].

The *Internet Economy Indicator's Newsletter* regularly summarizes economic data from various organizations related to the Internet economy. Noting the Internet started as an alternate marketing channel, the newsletter reported this channel has been turned into a complete economic system including low-cost communication networks using Internet technologies and standards; applications in human capital that

enable business to be conducted over this infrastructure; interconnected electronic markets; producers and intermediaries providing a variety of digital services; and emerging policy on legal frameworks for conducting business over the Internet. The newsletter reports that over one million new jobs have been created by the U.S. high-tech industry since 1993. Furthermore, preliminary employment data from the U.S. Bureau of Labor Statistics indicates the U.S. high-tech industry employed 4.8 million workers in 1998, making it one of the nation's largest industries.

The Internet economy part of this industry alone supported an additional 650,000 jobs in 1999, and revenues soared to over \$0.5 trillion dollars, according to the University of Texas at Austin Center for Research in Electronic Commerce. The Internet economy now directly supports 2.476 million workers, more than the insurance, communications, and public utilities industries; twice as many as the airline, chemical and allied products, legal, and real estate industries. Furthermore, this Internet economy grew 62% in 1999 and reached about \$850 billion by year-end 2000. This estimated level of revenue will make the Internet economy larger than the auto and truck (\$728 billion), and the life insurance (\$724 billion) industries. Internet-related revenue growth in 1999 was 15 times the growth rate for the U.S. economy. Furthermore, the U.S. Department of Commerce reported that high-tech workers in 1996 earned an average wage of \$46,000 per year with salaries more than 50% above the average wage of \$28,000 for all workers [2].

With the Internet economy driving the increase in the global economy, business schools must accept responsibility for preparing business professionals for this new Internet economic climate. How are these future e-commerce employees being prepared? Should e-commerce be a separate academic subject, separate program, separate major, or should e-commerce be integrated with other business classes? Many business deans say implementing separate e-commerce programs or courses misses the point. Other business deans and professors believe the opposite is true, claiming their business school students are excited about taking special e-commerce or e-business classes. Deans on both sides of the argument agree, however, the Internet is crucial to the

opened our e-commerce emphasis.

All students in The College of Business at Utah State, including business information systems students, must complete a common body of knowledge and general education classes. Since these classes are taught primarily at the freshman and sophomore levels, the students begin their e-commerce emphasis in the third semester with more classes in e-commerce as they proceed in their careers.

As illustrated in the accompanying table, students begin their business information systems and e-commerce program with a computer applications class that includes utilizing spreadsheets and databases for business purposes and an introduction to business information systems theory class. It is axiomatic that

students emphasizing e-commerce be competent programmers; so we require two semesters of C++ programming and one semester of Java programming. Although there is currently no room in the curriculum for extra courses, many of the brightest students take the third C++ course which concentrates on algorithms and data structures.

Since every e-commerce site has a database at the back end, students take at least two semesters of coursework specific to

future of business schools and that in time e-commerce or e-business will be a recognized business school model [4].

E-Commerce Instruction at Utah State

Members of the Business Information Systems Department at Utah State University chose to integrate the e-commerce expertise by introducing a series of e-commerce classes within the current business major curriculum. These classes are recognized as a formal emphasis in e-commerce and that emphasis is identified on student transcripts. We also found at least two-thirds of the IS curriculum is equally important to students in e-commerce. We worked closely with our business and industry advisory committee as well as the local Chamber of Commerce as we devel-

oped our e-commerce emphasis. The first semester focuses primarily on data modeling, relational database design, and core ANSI SQL programming. We address such advanced SQL topics as triggers, derived tables, views, materialized views, and advanced joins. The second semester of database primarily focuses on development issues and programming the Oracle database product. This includes the extended SQL language known as PL SQL. It is noted, however, that there is some theory and application integrated in each class and students graduating from this e-commerce emphasis should be able to quickly adapt to any database management system (DBMS).

Since the Web is a major communication vehicle for e-commerce, classes provide students technical expertise in Web design as well as server-side Web

Utah State's business IS and e-commerce program.

Sophomore Year, Fall Spreadsheets and Database Applications	Sophomore Year, Spring Introduction to C++ Introduction to Business Information Systems
Junior Year, Fall Advanced C++ Database Management Design and Theory Business Projects Using Visual Basic	Junior Year, Spring Database Implementation (Oracle) E-Commerce/Web Design Marketing Institutions or Promotion Mgmt
Senior Year, Fall E-Commerce Development/MS Interdev Advanced Data Communications Managing the Internet and E-Commerce	Senior Year, Spring E-Commerce Business Strategies Open Systems Advanced Web site Development Advanced Internship

development. A good design is imperative for an e-commerce operation; so our students learn how to design Web pages that include animation and sound in the spring of the junior year and peripherally in other classes.

During the senior year, we offer two courses on advanced Web site development for e-commerce sites. One course uses the Microsoft suite of tools that includes Visual Interdev, Visual Basic, SQL Server, .NET Suite, and the Microsoft Web server product. The second course also concerns advanced Web site development but uses open systems tools such as Perl, Javascript, and Apache Web server. Both courses include instruction on connecting the back-end database to the front-end interface as well as managing the client/server architecture. It is also noted that in both classes, students complete realistic projects as they work with local businesses and industries.

Finally, students are *required* to complete an internship of at least 300 hours working with a business in some phase of e-commerce. So far we have considerable demand from businesses throughout the region that want to use our interns to help them initiate their e-commerce sites.

What sets us apart is the technical part of the program. Upon completion of this program, our students have expertise in technical, business, and managerial skills. The strength of the program is our graduates are highly productive from a technical standpoint on the first day of the job. They also understand the business implications of e-commerce decisions so their careers may flourish. Finally, they have managerial skills so they can start and finish e-commerce projects in a timely, cost-effective manner.

The Challenge

Practical e-commerce programs have many challenges for faculty and students. The first challenge is enlisting the support of all faculty and administration because this type of program requires high levels of effort and commitment. This includes a commitment by faculty to keep up-to-date. Besides reading the literature, faculty must attend workshops and work closely with businesses. Another challenge concerns acquiring hardware and software. We try to assist faculty by providing the appropriate hardware and soft-

ware, which is no small task considering the rate of change in the e-commerce area. Nonetheless, there is a strong commitment to keeping current technology in our labs and faculty offices.

Many software companies have provided software grants, which is the only reason we are able to provide our students hands-on instruction to the extent we do. (For example, we use the Rational Rose UML tool and the Oracle DBMS that were both donated.)

Furthermore, textbooks are frequently unavailable on very contemporary topics or they are two or three years out of date—an eternity in the e-commerce and IS field. Thus, faculty frequently develop their own materials, use Internet sources, or work with software companies in order to keep current materials in front of the students.

E-commerce is here to stay. In fact, the Internet may be the seminal event of our generation, transforming the U.S. and global economy and impacting that economy on par with the introduction of railroads, electricity, the telephone, steel, and the automobile. The Internet has the possibility to become the ultimate infrastructure for computing, telecommunications, and e-commerce and will no doubt affect everyone in some way. Business school faculty and administrators must not lag behind in terms of Internet instruction, but indeed, must produce the leaders to develop the Internet economy. These leaders must be management leaders *and* technology leaders as well. ■

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LLOYD W. BARTHOLOME (Lbart@b202.usu.edu) is professor and head of the Department of Business Information Systems, Utah State University, Logan, UT.

DAVID H. OLSEN (Dolsen@b202.usu.edu) is an associate professor in the Department of Business Information Systems, Utah State University, Logan, UT.