Achieving Significant Learning in E-Commerce Education Through Small Business Consulting Projects

Sharon W. Tabor
Networking, Operations, and Information Systems
Boise State University
Boise, Idaho, 83725, USA
stabor@boisestate.edu

ABSTRACT

Spanning almost a decade in the business vernacular, electronic commerce has been an exciting endeavor for the business world and a challenging field in which to teach. From the launch of instant success stories such as Amazon.com, and the glory days of rapidly accelerating Internet stocks, electronic commerce has evolved into a valid business methodology, and the Internet accepted as an appropriate alternative distribution channel. Cross-functional in nature and with rapidly changing technology, electronic commerce challenges our ability to develop meaningful academic experiences that build marketable technical skills. The good news is that maturity in this area may finally have yielded a level of stability in course content and successful learning experiences to prepare our graduates for a world that thrives on electronic business. This paper outlines the issues and challenges of developing electronic commerce curricula to achieve Fink's definition of *significant learning.* One method of accomplishing this goal is through team projects in which students consult to small businesses, collaborate on development projects, and achieve significant learning though the realistic application of theory.

Keywords: E-Commerce education, significant learning, team projects, consulting skills

1. INTRODUCTION

Electronic Commerce (E-Commerce) education in the IT curriculum from the mid-1990s through the present has been one of never-ending change, not to mention endless class preparations. One of the reasons is that this exciting new field of study was initially poorly defined, and certainly over-exposed in the business press. Early books spoke with reverence of electronic commerce as "an entirely new method to conduct business" (Mougayar, 1997, p. 25), "a catalyst for dramatic changes in internal organizational functioning" (Kalakota and Whinston, 1997, p. iii), and the foundation of the New Economy (Davis & Meyer, 1998). From these initially ambitious assertions, through the struggle over ownership and the eventual dotcom bust, E-Commerce has changed in content and focus and E-Commerce education has transitioned along with them.

The exuberance of the E-Commerce foundation literature gradually became more focused as we experienced as many as 5,000 Internet business failures from 2000 through 2003 (Kessler, et. al 2003). Those failures showed us that early E-Commerce adopter companies often had the wrong business models, or none at all, and that a poorly conceived fulfillment process such as that of eToys (Preston, 2001) would doom any venture. Along the way we realized that electronic commerce was a logical extension of interorganizational systems, an evolution of industry-specific electronic data interchange, and a living example of divergent strategic information systems (McCubbrey, 1999). We now know the survivors and success stories of 21st century electronic business are most often successful brick-and-mortar companies, rather than the hot Internet start-ups of the late nineties.

Complicating the normal challenges of preparing a technical workforce in a fast-changing area, electronic commerce research shows an increasing tendency for business strategy and technical projects to be initiated outside the Information Technology (IT) organization (Swanson, 1994). IT professionals-in-training must be aware of the likelihood of this phenomenon and understand the cross-functional implications they will face on the job. Fortunately, many organizations claiming success with electronic commerce emphasize the importance of getting IT involved early in the strategy building process, and before a functional business model is developed. In fact, a new breed of IT professional that is business savvy as well as technically competent seems to be a critical factor for electronic commerce success (Tabor & Wojtkowski, 2001). This trend supports what academics have been hearing from business advisory boards across the country -- that general business knowledge, communication, and team skills are as important as the technology students learn in their degree programs.

Today, exuberance has been tempered and electronic commerce has evolved into an acceptable business methodology. Stakeholders in both corporate and academic worlds have arrived at a peaceful level of coexistence about ownership and roles. The business must decide on the model that works for them, marketing will work on branding, promotion and other things they do best, the logistics and distribution professionals will implement the supply chain and manage the fulfillment processes to deliver the goods, and IT will make it all happen with technology. What an interesting trip it has been!

2. E-COMMERCE CURRICULUM CHALLENGES

Electronic commerce and the many new technologies that came with it were introduced into the IT curriculum at most universities as rapidly, if not more so, than any other new technology in the brief history of our field. As early as the mid-nineties, several well-known schools established electronic commerce research centers to partner with business and better meet their needs. Masters programs were created to develop the next generation of dotcom heroes, while undergraduate programs added courses or specialty tracks. Aside from the typical issues of delivering courses with new technologies, E-Commerce was a challenging course to develop given the constantly changing definition and relationships with various business units and academic disciplines. Business strategy, marketing, auditing, and information systems programs all began the campaign for resources to address the perceived needs in their individual areas.

We know that electronic commerce is not only about technology, although a great deal of technology is required to make it happen. Information technology majors need to know about business goals and objectives from various perspectives before they can adequately understand organizational needs and develop an appropriate technical solution. It also became clear early on that applying the concepts of systems analysis and design through the standard phases of the application development life cycle probably wasn't going to work in an area where rapid prototyping and changing output was demanded by stakeholders. A whole new way of approaching team building and teaching development models was needed to address these new challenges. Local companies working on early E-commerce projects offered little help, as they worked through their own internal issues.

2.1 Enhanced Learning Experience

On the upside, E-Commerce education presents some unique opportunities to achieve what Fink (2003) classifies as *significant learning*. As an updated approach to Bloom's adaptive learning theory, Fink proposes combining foundational knowledge, application, integration, human dimension, valuing, and lifelong learning. Each of these various types of learning and learning outcomes stimulates the other to achieve significant learning (Fink, 2003). The potential for accomplishing significant learning is high in the multi-faceted area of E-Commerce, but not without instructional design and other pedagogical challenges.

2.2 Textbook Selection

Selecting a textbook is an important step in any course development process. Early E-Commerce textbooks were highly slanted toward management issues, and today are only slightly better as they have slowly evolved to include technology. The technology, by necessity, remains basic because the fast-paced nature of technical change and a fickle marketplace do not allow today's trends to be adequately addressed in a typical publishing cycle. While the quantity of E-Commerce textbooks on the market has increased dramatically, there is still an inequality between business concepts and technical content.

A major factor in textbook selection, of course, is the positioning of the electronic commerce course in the curriculum. For example, E-Commerce is offered at our university as an upper division requirement for Networking and Telecommunications majors and an elective for Computer Information Systems majors. Listed prerequisites include an introductory marketing course, as well as introduction to networking, a procedural programming language, and a network application development course, heavy in scripting and database connectivity. Most students have also fulfilled the required business core, and are taking the class in their senior year. Many E-Commerce textbooks still contain one or more chapters on Internet technologies and include early tools like CGI scripting rather than the newer development choices. Although this may be appropriate for programs without other technical coursework, we find this approach redundant and unnecessary for our students who have studied these areas in semester-long courses in their information systems or networking major.

2.3 Course Content

From the early days of having few comprehensive textbooks, to the current world of open systems versus proprietary Web development technologies, content requirements have finally stabilized to areas similar to those shown in table 1, with technology choices greater than ever. While it is unlikely that any single set of topics will serve all programs, it is rare to find this combination in a single textbook. Our course includes content from basic E-Commerce textbook plus author-developed material on user interface design and usability. A Web site analysis exercise to discuss design and functionality of existing sites is conducted early in the term, as well as several team-building exercises. Approximately 30% of class meetings are devoted to the technology component and the functional semester project.

Over the past six years, the author's undergraduate E-Commerce course has moved from having a very small Web technology component, to a very heavy application development approach, and back to what feels like an appropriate balance. Along the way, other courses in our curriculum added Web technologies and development tools

to provide needed technical prerequisites and student projects have become increasingly sophisticated. We also moved from having tight scheduling issues with technology-fitted classrooms to having a dedicated networking and telecommunication lab that supports hands-on teaching. Additionally, many of our undergraduates earn their way through school with Web site development, and from that regard project management and legal components have been added, as well as more in-depth usability and design components. Privacy issues, particularly related to children, were covered in depth last term when one project team worked on a Web site for a ranch offering horseback riding lessons and summer camping programs.

Historical overview & positioning	Web site accessibility issues and technologies	Web development options & issues
Marketing & revenue models	Web site critique & analyses	Open source vs. proprietary environments
B2B strategies & business models	Standard EC functions & payment systems	Integrating EC into the business
Technology infrastructures	Security threats & control implementation	Technical tools & hands-on development
User interface design issues	Legal, ethical & privacy issues	Project Presentations

Table 1. Representative Content for an Undergraduate EC Course (Schneider 2003; Tabor 2005)

3. PROJECT-BASED APPROACH

To address the challenge of developing a course that adequately balances both business and technical issues, the author searched the instructional design literature and also drew upon a twenty-year business background in management and technical consulting roles. The major design goal was to find an approach that would address team skills, improve the overall team experience, and achieve Fink's level of significant learning, while better preparing IT students to contribute in our increasingly electronic business environment.

Several different project scenarios were tried over the first few semesters. 1. small group projects of the teams' own choosing, (projects tended to have few commerce components); 2. a virtual company project that called for each class section to conceptualize a company scenario that included intranet, extranet, and commerce components (the teams had to work together, as well as within and communication was much more difficult). In the final analysis, working with live companies and small group teams seems to be an optimal solution. This method allows students to rapidly analyze needs and apply new skills to solving business problems while still in learning mode in the classroom. In addition to being a more successful project effort, students contribute to the local business community by developing EC models and prototype Web sites that help small organizations expand their horizons and explore the potential of electronic commerce. Additionally, in most countries small businesses tend to be the largest growth segment, and potentially stand to benefit greatly from E-Commerce adoption (Ince, 2000; Korchak & Rodman, 2001).

The level and nature of technology taught in the course is impacted by the small business consulting approach. While previous semesters used tools such as *ColdFusion*® or the *Visual Studio*® environment, the low technology budgets of most small enterprises often mean they will not be able to implement the prototypes presented to them by the class teams. Switching to a Microsoft® community-supported, freeware tool called *Web Matrix* (www.asp.net/webmatrix) along with open source tools such as PhP (www.php.net) and MySQL® (www.mysql.com) presents students with a choice of full featured development environments, allowing them to deliver a professional and functional project that may be economically implemented. Ultimately, a strong understanding of Web development standards and distributed database connectivity prepares students to adopt whatever tools their future employers may require. The process of developing for actual users with vocal opinions greatly improves Web interface design skills.

Students are able to apply business skills learned in core and technical courses along with their prior Web development experiences to actual business problems, framed within their ongoing study of E-Commerce principles. They often find that the small business owners have little background to prepare them to enter the E-Commerce arena, but many feel that they have to have a Web presence. Students are forced to learn and apply diplomacy in setting expectations and guiding the business owner to a workable E-Commerce solution.

3.1 Consulting Model & Success Components

The model in figure 1 summarizes course components that have proven to be important for successful project outcomes, as identified by the author over six semesters of refining project-based teaching. This model stresses the importance of integrating strong conceptual business skills with a basic understanding of technology, developed both in prerequisite courses and in the E-Commerce course. New technical skills, proper business communication, and team skills are further developed with homework assignments, labs and team-building exercises. The semester project is wrapped within a well-defined set of expectations and scheduled milestones. The overall process, of course, is ultimately dependent upon student buy-in to be successful.

Based upon the author's industry experience, this model is also a usable process that can carry students forward into the work place where they will participate in technology projects throughout their careers. Over several semesters of teaching to this model and receiving detailed feedback from students, the major process components in the model are addressed in the following ways.

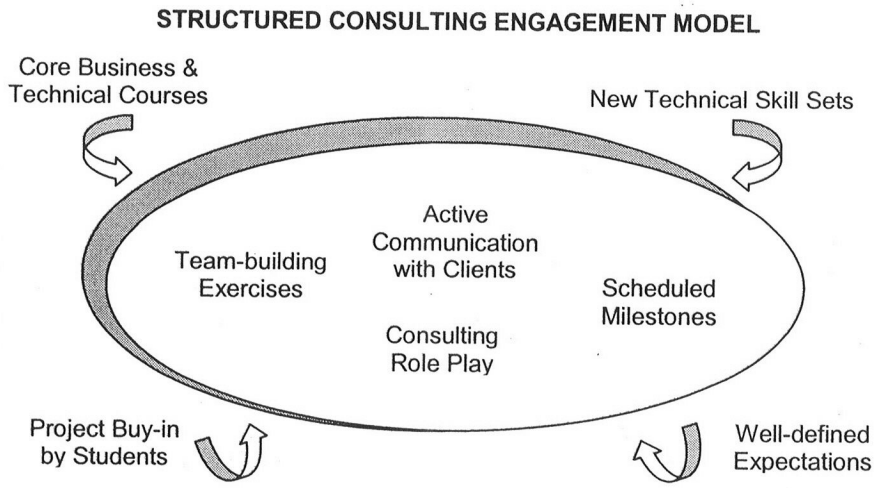

Figure 1. Success Components for an E-Commerce Project Based Course (Tabor, 2005)

3.1.1. Student Buy-in: Each class votes on whether or not to work with live businesses, thereby achieving concept buy-in. None have totally rejected the idea. Various students typically make suggestions for business participants, but the professor carefully screens these options to insure they will provide an appropriate E-Commerce project experience and that the business owners will have the time to communicate with teams.

3.1.2. Well-defined Expectations with Scheduled Milestones: A five-part project milestone plan and team contract (included in the Appendix) was developed and modified over time to include minimal task elements that lend structure in fulfilling the basic project requirements, while allowing flexibility in how the tasks are accomplished and with the team's choice of technology. It is emphasized that this is a contract between the team members to encourage equal participation and group consensus for meeting milestones. Each milestone section includes task items that, as developed, become part of the final project report, thereby encouraging continuous progress on the final project document. Milestone task items are reviewed in class prior to each deadline to insure understanding, and teams are allowed to revise prior milestones after the fact to make up missed points. As part of each milestone submission, members commit to the next set of tasks, responsibilities, and output for that section of their team contract.

3.1.3. New Technical Skill Sets: Hands-on labs in class and technical homework assignments address the basic technical tools available to the teams to complete their prototypes. In past semesters these have included JavaScript and CGI, *ColdFusion®*, *Visual Studio®*, PhP and *MySQL®*, and Web Matrix. Refresher material is linked to the class Web site to cover Web technology the students should have learned in other classes, but may have forgotten. In this manner, every student is exposed to enough technology in the classroom to ensure they have the skills to develop basic E-Commerce applications and each team member has an equal chance for success.

3.1.4. Conceptual Business and Technical Knowledge: An E-Commerce textbook is chosen that includes basic business issues that can be easily supplemented with current materials from the Web and print media. Supplemental materials developed by the author typically include case studies, elements of good Web interface design, usability, and accessibility, analyses of E-Commerce Web sites, and secure transaction technology.

3.1.5. Team-building & Role Playing Exercises: Several class meetings are used to help develop rapport within the teams, as well as basic consulting skills to prepare team members for working with their client companies. One such exercise is a puzzle that has to be completed without any verbal communication. Each person has their own set of pieces to contribute, but has to do so with some kind of logical, yet silent process. Natural leaders tend to emerge, but all members must contribute to complete the task. Communication processes and styles are discussed and sample templates are developed as a group to aid in client interviewing and interaction, and providing a structured and professional client engagement process.

3.1.6. Active Communication with Clients: Information about the small business population is shared before teams meet their clients to ensure teams have reasonable expectations about the small business environment and their understanding of E-Commerce and technology in general. Students are continually amazed that in a few short weeks they typically have a much greater understanding about E-

Commerce than their client companies. Communication problems and client perceptions and expectations are discussed at various times during the semester to share different team experiences. For example, teams consistently report a lack of technical resources among the client companies. Several teams have experience over-zealous clients who wanted daily updates and had very specific ideas about their site design and content. Small business owners may come to class to talk about their businesses, and all attend end-of-semester presentations where they are given a full copy of the project report and Web site code. In past semesters, several teams have been hired to take the prototype live, and others have taken their final project binders to job interviews and have been hired based upon the quality of their work.

3.2 Emphasizing the Team Experience

An additional goal of the project-based approach to teaching E-Commerce is that of getting students to benefit and learn from the team experience. Going into this class, many students have been overdosed with team projects throughout their business school curriculum to the extent they really dislike the process. This is a common complaint among IT students across many universities (Van Slyke, Trimmer, & Kittner, 1999). During several semesters of fine-tuning, the simple survey shown in table 2 was conducted before the start of the project and after its completion.

Survey outcomes are amazingly similar from semester to semester. It is satisfying to note that students like the structure provided to help them as they begin the project, and consider developing usable output for a real company to be more rewarding than project teams who simply prepare a paper together. They typically have higher expectations going into the project compared to other team efforts, and they feel the project learning value was above average. Some have said it was the best project experience of their academic career.

Pre-project:	S.001	S.002	Combo
On previous teams all members contributed equally:	2.5	2.16	2.3
My expectation for learning for this project is high:	3.8	4.04	3.94
Post-project:			
On this team all members contributed equally:	2.88	3.78	3.4
The learning value for this project was high:	3.29	4.22	3.82

Table 2: Pre & Post Survey Means on Selected Questions, Spring 2004 (1=strongly disagree to 5 = strongly agree)

It should be noted in the table 2 results, that section S.001 is a more traditional mix of daytime college students, while the S.002 section was the evening group who are more often employed full or part time. Working students with many time constraints particularly tend to rebel against low value project experiences, but will contribute well to one they feel is a true learning process. Addressing the needs and constraints of this non-traditional student population is an ongoing challenge.

While some instructors prefer to assign student teams, either by random methods, or by carefully examining student skills, the author prefers to allow students to form their own groups. The logic is that many know each other by the time they reach this class, and have developed trust relationships that enhance the team experience. In lower division courses, this may not be the case, and it may be more important to try and balance team skills and composition. Teams with three to four members have proven to be the most functional, and will keep communication and meeting time issues to a minimum. An anonymous peer evaluation form is included with the final project deliverable where team members evaluate each student's performance on key team success factors as well as total contribution to the project. An averaged set of results is given to each student after the final project presentation for reflection and personal growth.

4. CONCLUSION

This paper has concentrated on the development and delivery of an undergraduate E-Commerce course in an urban university in the western United States. Our graduate level course, by design, concentrates more on the managerial issues of planning for and implementing E-Commerce projects, as well as organizational impacts and issues. Case studies are heavily used at the graduate level. Interestingly, graduate students still like a technology component, and the class will often build projects based upon their choice of tools. Several of these projects have resulted in newly formed Web-based businesses.

Most academics will agree that teaching E-Commerce is challenging, but never dull. If only one course is available in the curriculum, it fits well as an upper division offering that builds upon other course knowledge in the various functional areas of business, as well as specific skills gained in analysis and design, database development, and procedural languages. The project option is a natural extension, and offers various ways to add value to the team experience, achieve significant learning, and prepare students for the increasingly common business methodologies and processes of our electronic world.

5. REFERENCES

Bloom, B.S. (1956), (Ed.) Taxonomy of educational objectives: The classification of educational goals: Handbook I, cognitive domain. Longmans, Green, New York, Toronto.

Davis, S. and C. Meyer (1998), Blur: the Speed of Change in the Connected Economy. Addison Wesley.

Fink, D.L. (2003), Creating Significant Learning Experiences: An Integrated Approach to Designing College Courses. Jossey-Bass.

Ince, J.F. (2000), "There's no Business Like Small Business." Upside Vol.12:11, pp. 166-167.

Kalakota, R. and A. Whinston. (1997), Electronic Commerce: A Manager's Guide. Addison Wesley.

Kessler, M., M. Kranz, K. Maney, J. Swartz. (2003), "Internet 1.0." USA Today, June 23.

Korchak, R. and R. Rodman. (2001), "eBusiness Adoption Among U.S. Small Manufacturers and the Role of Manufacturing." Economic Development Review 17:3, Winter, pp. 20-25.

Mougayar, W. (1997), Opening Digital Markets. Cyber-Management Publications.

McCubrey, Daniel J. (1999), "Designing an Electronic Commerce Curriculum," Communications of the Association for Information Systems, Vol.1, Article 2, 29 pages.

Preston, R. (2001), "E-Business Credo: Meet Commitments To Customers." InternetWeek, 03/05/2001 Issue 851, p9.

Schneider, G., Electronic Commerce, Fourth Edition, Course Technology, 2003.

Swanson, E.B. "Information Systems Innovation Among Organizations." Management Science, 40:9, 1994, pp. 1069-1092.

Tabor, S., and W. Wojtkowski. "Creating a Successful Web Presence by a Leading Manufacturer of Memory Products: A Case Study." Proceedings of ISD 2001, London, September, 2001.

Van Slyke, C., K. Trimmer, and M. Kittner. "Teaching Teamwork in Information Systems Courses." Journal of Information Systems Education, Vol.10:3 1999, pp. 36-46.

AUTHOR BIOGRAPHY

Sharon W. Tabor is an associate professor of Networking and Telecommunications at Boise State University. She earned a BA in Accounting and MBA from Lewis University near Chicago, and her PhD in Business Computer Information Systems from the University of North Texas after a 20 year business career. She is the author of numerous conference papers, book chapters, and refereed journal articles in the areas of electronic commerce, electronic business models, small business technology adoption, web technologies, and web-based survey research. Other interests include computer and network security and hybrid course development. She is a member of several national professional associations including ACM, AIS, AITP, and IRMA, and serves as an officer in the Boise chapter of the Information Systems Security Association (ISSA).

APPENDIX – STRUCTURED PROJECT DOCUMENT & TEAM CONTRACT

Instructions to Students: This team contract represents a living document that breaks your project into logical units and identifies responsibility for individual tasks, building toward the final prototyping report. Do a thorough job of discussing each task item due in each milestone (PM). The final report will be compiled from these sections, with appropriate updates plus the addition of an executive summary and table of contents.

Use the following task tables as a guide, adding or modifying tasks as needed. The goal of the milestone format is to gradually build your final report along with the prototype, adding structure to both processes. The team will assign responsibility in each PM for tasks due in the next PM. You may use project management software rather than the table format if you prefer.

PM1 Deliverable - Team Organization & Availability Table - Due: 9/25

Team Name _____
Contract for (description & function) _____Indicate a team leader for contact & coordination

Member Name	Phone	E-Mail Address
1. .		
2.		
3.		
4.		

Availability Table (indicate by number when people have time to meet).

	Sun	Mon	Tues	Wed	Thur	Fri	Sat
1100		2	2	2	2		
1200		1,2	2	1,2	1,2		
1300	1,3	1,2,3					
1400	1	4	4	4			
1500	1,2	4	4	4			
1600							
1700							
1800		3	3	3			

Project Tasks: Schedule meeting times and responsibilities to accomplish the following tasks for PM2. A written discussion of these topics is due at that time. Add other tasks as needed to fit your project parameters. Each team member should initial the tasks chosen and sign the completed contract section.

Tasks	Task Mgr(s)	Due Date	Initials
Client overview & business problem			
Web site reviews & analyses			
Targeted e-commerce strategy			
Expected user group and profile			
Task list / project plan / gantt chart			
Project Assumptions			
Coordinate documentation for PM2 (due 10/25)			

Signature Section:

"My signature below indicates I understand what is required of me. I accept full responsibility for those deliverables or tasks I have initialed." (Include team members typed names & date

_____ _____ _____ _____

PM2 Deliverable: Project Plan & Web Site Map - Due: 10/25

Your PM2 deliverable includes each item in the PM1 task list in written form with an appropriate report section heading. For example, item #1, Web Site Reviews & Analyses, should include a discussion of any Web presence your client

company may currently have, analyses of competitive sites that have similar products or services, or sites that the client or team members particularly like in terms of layout, design, or function. Indicate how any strong points or weaknesses in these sites will be addressed in your prototype.

Project Tasks: Schedule the following tasks for delivery in PM3. A write-up on these tasks is due for the next PM. Add other tasks as needed to fit your project parameters.

Tasks	Task Mgr(s)	Due Date	Initials
Project scope & content			
Page layout & design criteria			
Navigation plan w/site map			
Printed sample of web design and page layout			
Development tool options build & plan			
Coordinate documentation for PM3 (due 11/20)			

PM3 Deliverable: Plan update w/site map and function document - Due: 11/20

Compile all former summary sections into well flowing, properly written business report sections, updating the plan and technology choice as needed. To this material you will add a table of contents, an executive summary that summarizes the client's goals and business problem, and section tabs. Write for your client, not for your professor, particularly in describing your technology choices, options, and future enhancements. For PM4, please submit two copies (1 notebook only) which will not be returned to you. Include a CD-ROM copy of your report and prototype for the client. One hardcopy report is for your client, and will be included in a common binder with other team output. The second copy is for the professor. Include your set of team evaluations for your peers in a sealed envelope. Add other tasks as needed to fit your project parameters.

Project Tasks: Schedule the following tasks for report submission in PM4.

Tasks	Task Mgr(s)	Due Date	Initials
Executive Summary & Table of Contents			
Web site function document			
Usability test			
Security, privacy, trust issues			
Hosting & ongoing maintenance requirements			
Future functionality - proposal to implement if your team so desires; estimated time & costs			
Sealed peer ratings			
Coordinate documentation for final report (due 12/4)			

PM4 Deliverable: Final Project Report - Due: 12/4

Project Tasks: Submit your prototype report copies and schedule the following tasks to develop the presentation and demo for PM5.

Tasks	Task Mgr(s)	Due Date	Initials
Plan Presentation			
Client & strategy overview			
Development methods			
Site demonstration			

PM 5 Deliverable: Prototype Presentation - Scheduled

Use your final team time to complete your prototype and prepare your 30-minute presentation demo. Plan on a brief overview of your project goals and strategy, your development tools and methods, and your final demo. All team members should participate in the presentation.

Information Systems & Computing
Academic Professionals

STATEMENT OF PEER REVIEW INTEGRITY

All papers published in the Journal of Information Systems Education have undergone rigorous peer review. This includes an initial editor screening and double-blind refereeing by three or more expert referees.

ISSN 1055-3096