

An Information Systems Project Management Course Using a Service Learning Model

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Abstract

This paper describes the implementation of a capstone project management course that is a requirement for graduating seniors in an undergraduate Computer Information Systems (CIS) program at a regional university. The description provides a model which includes the culmination of students' academic training in Information Systems, IS, curriculum which is part of a Bachelor of Business Administration (BBA) program in an accredited college of business. The requirements include an application of technical and business skills, as well as systems development and project management skills—all working on an actual information technology project for an external sponsoring organization. Rationale for implementing this type of course includes the benefits it provides to the students, the project sponsors who participate in the projects, and the IS department providing the training. Feedback from the course is used as integral part of the curriculum assessment process used for accreditation purposes.

Keywords: Information systems project management, service-learning, capstone course, evaluation

1. INTRODUCTION

Because project management is one of the fastest growing career fields in business today, many universities currently include a senior projects class as part of their IS curricula (Olson, 2001). The role of projects in organizations is receiving increasing attention, and projects are becoming a major learning emphasis as a result (Gray & Larson, 2003). There is a national consensus among information systems educators that project management should be an integral part of an IS curriculum (ACM/AIS/AITP Curriculum Committee,

2002). Although some schools present project management as a case-focused course, the course described in this paper presents a client-service based model which provides exposure to "real-world" experiences.

As business degree students with a CIS option area were required to take only the standard business senior management capstone. The IS faculty did not feel that this management focused capstone course properly represented the IS specific coursework that the students take; therefore, an IS specific capstone was developed to help students better integrate

their IS coursework, and to help them prepare for a work experience in IS. From a curricular perspective, this class has two main objectives: 1) to give the students experience in applying IS training on real world problems while still providing them with the security of the academic environment; and 2) to help the students learn proper project management and report writing through guided experience in a simulated work environment as an acting project manager.

2. BENEFITS

When a client-based model of learning is imposed, the capstone project management course is a critical component of IS curriculum for the benefit of the students involved and the educational values of the program that presents the curriculum. The value students get from such a course is more than just the project management concepts taught in the course content. Students may also gain experience in real-world work environments doing original projects designed to meet the needs of the sponsoring organization that they are working within. The students are not the only beneficiaries of this course, the businesses that they work for can benefit greatly and the IS department at the training institution establishes better relationships with these respective businesses, who in turn may provide input into the overall curriculum. The department also directly benefits by evaluating certain components of this course for assessment recording and accreditation efforts. Some schools use these methods for constructing a more effective curriculum (Brewer, 2002).

For many of the senior students in the projects course this is their first opportunity to be involved with, and to apply their skills, in a professional IS-related work environment outside of a class-room setting. But, at the same time it is a safe environment because of and the presence and involvement of the instructor as a facilitator. This creates an environment in which students feel safer to take risks, despite the natural lack of confidence in the first application of their skills, because they know they have the support structure of IS faculty within the university which they may rely on when they encounter technical difficulties. Also, required student reports, both oral and written, discussing the status and functioning of the projects to the course instructor on a regular basis helps alleviate small problems as they arise so students get assistance with, and learn

how, to both find and acknowledge such problems and advise in solving them. This process allows students to build confidence in their skills and abilities and to experience and build confidence in functioning in a real work environment.

Through the course of the semester the instructor is also delivering content about both project management concepts and best practices. The content is structured specifically to build concepts and skills as the students need them during the course for their project. Thus, initially content focuses on issues of user interviewing; defining user requirements schedule building, communications and project planning. As the student projects progress content moves on to discussing issues of managing projects, managing groups, managing sponsor communications and project execution. This direct tie between the course's PM concepts and students' project schedules makes a student immediately aware of the relevance of the concepts and skills being taught. Students often struggle to understand the relevance of the content of a primarily lecture-based course, and how this content relates to their lives and work after they graduate. With this integrative content approach students are able to apply discussed concepts and learn immediately how it can benefit or applies to project management work.

Other obvious advantages to students in taking this course include the real work they've done in a sponsoring organization, which they can include on their resumes upon graduation. Also, since students generally take this as one of their last classes at the university they also have the opportunity to do valuable networking with employers and organizations in the region for future job possibilities.

Last, but not least, the sponsoring organizations which get the value of the students' labors and instructor's mentoring experience in the form of deliverables from the completed IS projects to meet a need in their organization. These small projects also help build relationships between the university and regional businesses which can lead to further opportunities like student coops, internships and even collaborative case-based research opportunities.

3. STUDENT GROUPS AND PROJECT ASSIGNMENTS

IS students in the project's class are formed into groups of two to four students and the groups are assigned a project during the third week of a 16 week semester course. Student groups are formed on the basis of the student skills necessary to complete sponsor projects. Student skills are assessed through a self-skills assessment survey which students take the first week of class. The self-skills survey focuses primarily on three areas 1) programming experience, 2) web development experience, and 3) database design and management experience. This survey also includes a section asking students for the topic they would feel least comfortable working in and the topic they would most like to work in. In order model a more realistic work experience students do not to projects individually; a large part of project management is dealing with people into vacations, in this to be excluded students working as individuals. The sizes of student groups are based upon the estimated hours to complete the project, and upon the need to get an adequate collection of skills necessary to complete a given project.

Student projects are derived from the needs of the organizations and business that agree to sponsor the students to do work for them. Sponsoring organizations can be local businesses local nonprofit organizations briefly various departments within the university. All these organizations though have a need that can be met through the IS deliverables produced by student project. The standard size for a project is approximately 50-70 hours of work per student per semester. Thus for the average group of three students a projects require approximately 175 man-hours of work. Projects are minimally scoped by the instructor in discussions with sponsoring organizations. Most of the instructor's efforts scoping the projects are done to assure that they can be completed within the allocated hours and the 12 to 13 weeks students have to work during a semester. Projects are also limited to those which students, having completed an IS program, would have the skills to be able to complete. Table 1 shows a breakdown of the types of projects that students have participated in during the last 4 years.

When student groups are formed they are immediately given contact information for their sponsoring organization and their sponsor. Student groups are then responsible to meet with project sponsors within the sponsoring

organization and begin the process of gathering these requirements and scope definition. Students are fully responsible for all contact with the sponsor from this point forward, and are expected to make all necessary arrangements for future communications throughout the remaining 12 to 13 weeks of the project. From the perspective of the student projects the instructor's role is that of a facilitator and students are expected to interact with the instructor as if he were a senior project manager responsible for the project in terms of their reporting on project status operations.

Table 1. Student Groups and Assignments

Project Type	Number	% of all projects
Business web site	27	47
Informational web site	2	3
Networking project	4	7
Database Development	22	38
Application Development (Programming)	3	5

4. MANAGEMENT OF PROJECTS

It should be noted that the instructor intentionally limits initial contact with the sponsor and does not fully scope the student project when making arrangements with the sponsor. Rather the instructor interviews potential sponsors just enough to assure that the project is suitable in terms of required expertise and the amount of required work to complete. One of the important aspects of this course is for students to get experience in doing systems analysis and design, including practice in user requirements gathering through user interviewing. If the instructor spends significant time interviewing the sponsor to fully scope the project prior to assigning it, the students, in their initial interview with the sponsor, might well find the sponsor much more thoughtful and educated about the project than the sponsor might have been without the thoughtful questioning and probing of the instructor. Thus, by limiting the initial discussions between the instructor and sponsor students will get a much more realistic experience in working with the sponsor to draw out details of the projects themselves.

One downside to this strategy is that without the instructor fully scoping the project initially

students have a higher chance of running into scope problems as the project progresses. Such problems include 1) students missing significant aspects of the projects scope or deliverables initially setting up the project, 2) students not fully understanding the scale and requirements of the project they have scope, and thus running the risk of that have sufficient time to complete the project as scoped, and 3) students end up with a project that is not what was initially expected from the project description given by the instructor, because the instructor, lacking a complete interview process with the sponsor, was not able to properly ascertain the sponsor's exact requirements for the project description.

During the 12 to 13 weeks in which students are working on their projects they are required to give a number of both oral and written reports on the project's status. Students are expected to maintain and monitor the status of the project through the use of project management software and are expected to demonstrate their functional use of this software in their oral and written reports. Students are expected to maintain regular and adequate contact with a project sponsors to assure project quality and that they are meeting their scope goals. Instructor contact with sponsors is kept a minimum to allow the students to free interaction to learn about proper communication with the project sponsor. Instructor contact with sponsors is limited to two to four follow-up calls during the semester to assure that students are 1) maintaining adequate communication lines with the sponsor, 2) doing the work that they are reporting, and 3) that the sponsor has no serious reservations about the status of the project or the student's competencies in being able to achieve the project's scope. Table 2 (Appendix A) shows the reporting that students are required to provide during the project.

To help contribute to the technical success of the project students are encouraged to get consulting help with technical issues from various faculty in the IS Department. This contact with faculty is, for the students, an opportunity to learn refine, confirm and improve the technical skills they need to complete the project. These consultations are also good for the faculty member as well since they provide an opportunity to observe students practicing the skills that are taught in our curriculum. This is a valuable form of self-assessment, to watch

students handle new and challenging problems in the technical area in which an instructor had taught a student. All of the have and do IS faculty participate in this consultative process with various student groups. Such consultative relationships are most often arranged informally by students seeking the advice of faculty they know, sometimes the projects course instructor will arrange such a relationship if students are in need of technical help to complete a project.

5. FINAL OBSERVATIONS

Many indicators have shown that students consider this course a very valuable part of their IS curriculum. Feedback from exit surveys of CIS seniors has consistently listed this projects class as very valuable. Also, another indicator of the value of this course is the many CIS alumni who have completed this course and have taken IS positions in the area have approached the instructor and offered to act as sponsors. These alumni have found great value in the class and the efforts of learning PM through a real-world project and they wish to provide similar opportunities for other students. Feedback from other faculty in the IS program and from sponsors, taken for program assessment purposes, also shows a great deal of positive support for this class. Currently efforts are underway to quantify the value of this class to the project sponsors and sponsoring organizations. This is effort is being conducted through the development of a survey to be given to sponsoring organizations who have sponsored a project in the last four years. The survey will look at the value of previously completed student project to the sponsoring organizations to try to assess whether these projects have met the user need for which they were developed, and whether the project deliverables are still in use. Current efforts towards improving the class include:

1. Improving student understanding of user requirements gathering both best management costs and better coordination through the students' required prerequisite systems analysis and design course.
2. Improving students' user interviewing skills through better coordination with their required oral business communications class.

3. Seeking better samples of corporate project report templates currently in use in industry in order to give students a better understanding of reporting requirements in project management today.

4. Including emphasis and understanding for students of the role of project manager certification and helping students understand the value of the class in gaining project management certification.

6. CONCLUSIONS

Capstone courses in MIS, CIS and CS programs are commonly incorporated into curriculum these days as they can be used effectively to assess several program objectives. This format provides considerable opportunity for collaborative learning, serves as an instrument for assessing the respective program objectives relating to both technical and professional (soft) skills, and meets the learning outcomes of general educational requirements for accreditation agencies for higher education.

To achieve the goal of assuring that students achieve objectives presented throughout the program of learning, the participants, working in groups on a client sponsored project, apply the systems they have learned about while they are exposed to recent developments in the field.

Appendix B illustrates a common evaluation instrument which could be used by faculty to assess a presentation by students who have finished the process of such a capstone course.

4. REFERENCES

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Appendix A

Table 2. Student Reporting.

Report	Type	Number Required	When Required	Description and purpose
Interview and Business Systems Report	Written	1 per individual student	1 week after first sponsor contact	- Describes the information gained from initial contact interview - Describes the organizational system in which the students' project deliverables will function
Feasibility and Planning Report (FPR)	Written	1 per group	3 weeks after first sponsor contact	Initial planning documents focusing on: Scope Definition Planning of project control structures for scope and communication Initial Work Break-down Structure Signed by Sponsor to show approval
Design Report (DR)	Written	1 per group	4 weeks after FPR	Final Planning documents with: Full design specifications for project implementation Full Work Break Down Structure Full Gantt Chart showing project schedule
Report	Type	Number Required	When Required	Description and purpose
Status Reports	Written	3 per group	At 2 week intervals starting one week after FPR	To keep instructor informed as to the status of the project schedule and any developing problems.
Project Manager's Report	Oral	2 per individual student	At 2 week intervals – alternating weeks with written status reports	To keep instructor informed as to the status of the project schedule and any developing problems.

Appendix B

Faculty Curriculum Assessment Observation Form
Student Project Presentations

Semester: _____ **Project Title:** _____

Using the scale shown below, please assess to what extent the students giving this presentation demonstrate mastery of the 14 objectives listed in the table. This scale is relative to the skills and training that our students should receive within our CIS curriculum. "Expected level" therefore would indicate that students demonstrate the level of competence that you feel our CIS graduates should have upon completion of our program. (Please note that further information on how details of these projects demonstrate competencies of our graduates will be assessed by review of written project portfolios.)

N/A	1	2	3	4	5
Objective cannot be assessed from the work presented	Minimal or no evidence of the objective was observed	Lower than expected competency in this objective observed	Expected level of competency in this objective observed	Higher than expected level of competency in this objective observed	Exceptional competency in this objective observed

Objective being assessed	Score
Communication Abilities	
1. Good speaking and presentation skills appropriate for a business report	
2. Understanding of audience for presentation	
Accurate and appropriate use of professional language:	
3. Technical Terminology	
4. Business Terminology	
5. Ability to function as a group, specifically to organize and present a group report in a coherent manner	
6. Ability to explain project work clearly and concisely	
Understanding and management of project	
7. Professional commitment to the project, sponsor and sponsoring organization	
8. Understanding of system in which the project's deliverables will function.	
9. Adequate and proper use of Project Management methods and practices	
10. Proper and adequate scoping and planning of project	
Project Design and Solution	
11. Adequate and proper use of good Design Methodology	
12. Ability to do original design and problem-solving	
13. Are the project and its deliverables an appropriate solution (for novices in the profession) to the problem addressed?	
14. Extent to which this project challenged students to learn new skills outside those directly taught within the CIS curriculum.	
Other (please write in):	

Additional Comments: (Please include other comments relevant to how this presentation conveys valuable assessment information about our curriculum. Continue comments on back if necessary.) (Also, feel free to comment about this assessment tool itself and its validity, effectiveness, and make suggestions for improvement of it.)