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# Applying the PMBOK to IT Project Management: Curriculum Design and Implementation

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## Abstract

This paper describes the challenges of incorporating generic project management principles and guidelines with the unique complexities of managing IT projects. The Project Management Body of Knowledge (PMBOK) disseminated by the Project Management Institute (PMI) represents best practices in managing all types of projects and serves as the basis for Project Management certification. However, there are unique characteristics of IT projects that may not be fully addressed in the PMBOK. This paper describes the development and delivery of a graduate course in IT Project Management in an MSIS program, and discusses the experiences and lessons learned in attempting to fulfill multiple pedagogical and practitioner-focused goals.

## Introduction

The majority of enterprises are moving toward "project-ized" organizational structures, in order to increase their flexibility in responding to rapid changes in their competitive environment. The continued permeation of IT into operational, tactical, and strategic levels of IT and non-IT companies alike underscores the importance of successful management of IT projects across industries. Employers often emphasize their need for personnel who work well on teams, but even more desirable is the ability to manage projects and lead teams to successful outcomes. This issue is exacerbated by the acknowledged scarcity of IT personnel, which academia is attempting to address by producing more, and more qualified, IT graduates, in bachelor's and masters' programs around the world. This paper describes a course developed and delivered in a Masters' program in Information Systems (MSIS).

## Justification

In spite of a growing need for the skill, knowledge, and career paths represented by the PMBOK, projects, particularly IT projects, continue to fail (e.g., Standish Group, 1995; Field, 1997; King, 1997). The biggest challenge in addressing these industry needs with curricula is the wide range of knowledge, skills, and experience needed to become an effective project manager, particularly of IT projects. The course described in this paper describes efforts to integrate the

structured body of knowledge and skills encompassed in the PMBOK, with an awareness of the unique challenges posed by IT projects. This includes the methods that have been developed specifically aimed at IT projects, namely the CMM (Capability Maturity Model) and other software engineering approaches.

## Course Goals and Learning Objectives

The MSIS program in which this course is offered is located at a regional commuter university in the suburbs of a large metropolitan area. The majority of students are working in industry and interested in upgrading both their managerial and technical skills and knowledge. They are expected to enter the program with some previous knowledge of systems and software development. The Project Management (PM) course is a core requirement early in the program.

Since the MSIS program is IT-focused, the PM course should include basic project management skills and knowledge, but also issues in managing software projects. A further complication is the current industry transition from structured software development methods to object-oriented approaches. Not only do students need to learn to manage IT projects in general, but they also need to understand object-oriented (OO) approaches in order to be able to adapt their PM methods to accommodate the unique challenges of OO software design. Furthermore, the course should also address team process issues, PM software tools, and technology support for distributed teams, such as groupware and related electronic communication media. Finally, one of the program's missions is to provide a balance between current industry practices and the broader context of current research in the field. These goals resulted in the following list of student learning objectives for the PM course.

## Learning Outcomes

The student should be able to:

- Work effectively on a team to plan, control, and complete a project.
- Manage project scope, time, cost, quality, human resources, risk, communications, and integration (PMBOK areas).

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<sup>1</sup> The course described here was delivered at Kennesaw State University, where the author worked at the time.

- Describe and explain the 5 levels, key processes, and key practices of CMM software process maturity.
- Prepare and track project schedules and budgets using appropriate manual and automated tools.
- Apply generic project management tools and methods to software development projects.
- Identify and evaluate important and useful resources for Information Systems Project Management.
- Analyze and critique project management case studies and situations, in both written and oral form.

## Course Text and Readings

At the time the course was delivered, no one textbook successfully integrated both of these goals.<sup>2</sup> Instead, the two main sources of information used as the foundation for the course were the PMBOK, available for free on-line from the Project Management Institute Web page (PMBOK, 1996), and the Capability Maturity Model (Paulk et al., 1993), also available for free from the Software Engineering Institute (SEI). These sources were supplemented with an extensive reading list (see References) and additional Web resources.

## Pedagogical Methods

The course is delivered using a variety of methods. These include lectures which integrate the PMBOK material with IT project development issues, in-class discussions alternating with electronic bulletin board discussions (using WebCT, an on-line course delivery software package), guest lecturers from industry, written assignments discussing and critiquing readings, and a semester-long major team project with interim deliverables. The students are also required to create a simple Web page with their picture and biographical information early in the course to attempt to create a sense of on-line community, to help each other in forming teams, and to use as shared workspaces for project activities and deliverables. The students are encouraged to use project management software, such as MS Project and CoStar (a software cost estimation tool based on the COCOMO model).

## Results and Discussion

Implementation of the course revealed several challenges. These have included not only the extensive

amount of material to be covered in one semester, but also the challenge of effectively integrating multiple perspectives on project management (PMBOK, software engineering, and OO). Another issue is the lack of software that supports distributed project teams in all the areas needed, including planning, budgeting, cost estimation, monitoring, knowledge management, workflow, and communication.

In general, the students in the class are mature, motivated, and pro-active in pursuing their educational tasks. It is tempting to let the teams work independently without much supervision. However, the first time the course was delivered, the instructor determined that the student projects should have been monitored more closely during the semester, and the teams provided with more interim feedback, since a couple of the projects by the end of the semester failed in one way or another.

Nevertheless, the students and instructor have considered the course a success. Since many of the students are working in industry, the biweekly in-class and on-line discussions are especially effective in allowing students to share their own industry experiences with each other. (For example, one student was a consultant with a company that had recently been assessed at Level 5 of the CMM). The instructor requires each student to bring a prepared discussion question to each session, and to write up and turn in later one-page summaries of the key issues raised in each discussion session. Finally, an especially effective learning activity has been for each team to present to the rest of the class the outcomes of their team projects, focusing on assessment and lessons learned as in a project closure document.

## Conclusions

This paper describes a relatively new yet increasingly important curriculum area that addresses a significant industry need. One intention of the author is to promote discussion and further development of PM curriculum. In order to produce effective project managers, educators, researchers, and practitioners all need to incorporate the combined knowledge provided by separate streams of study and practice: generic project management, software engineering, OO development, groupware, and computer-mediated communication (and probably others).

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<sup>2</sup> Since then, we have adopted Schwalbe (2000) as the main text, although we still include the PMBOK and the CMM.

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