Chapter 1
Teaching Software Project Management

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ABSTRACT

Software project management is an inherent part of software engineering. While technical expertise is an important factor to complete a software product, knowledge and experience in project management are equally important. Teaching software project management is always a challenge. Most software engineering courses teach technical skills and knowledge on software development but lack project management guidance. On the other hand, project management courses taught by management faculty do not connect to technical activities. Therefore, a blend of technical and managerial skills must be taught together to train software engineers. This chapter describes the author's experience in teaching a graduate level software project management course with emphasis on blending technical and non-technical skills. The chapter includes the different modes/styles in which the course was taught, the challenges faced, the benefits gained, and the current status of the course.

INTRODUCTION

Managing a software development project is a required skill for a good software engineer. A software project will fail (may not be implemented correctly, may be delayed or may overshoot the budget) if it is not managed properly right from the beginning. For large complex software systems, effective project management is mandatory because failures in such projects lead to major business loss. Often, software engineering courses focus on technical aspects of software development such as requirements engineering, design, coding and testing. Even though some instructors of software engineering courses discuss management issues briefly, the students in these courses do not get adequate exposure to apply and to practice management skills. It is therefore evident that a separate project management course is necessary

in a software engineering curriculum. This course is different from a project management course taught by the management faculty in the sense that the former focuses more on the management skills required through software development life cycle activities.

The author introduced the course titled "Management Issues in Software Engineering" as part of the Master of Software Engineering (MSE) program at the University of Wisconsin-La Crosse (UW-L). The aim of the course is to teach software project management but at the same time the students must apply the management skills to a software project. The students in this course are expected to complete a course on technical skills first. Therefore, it would be easier to teach only the managerial skills and ask the students to apply both technical and managerial skills at the same time. The contents of both the courses fit very well with the guidelines posted in Software Engineering Standard (GSwE, 2009). The students in the management course are divided into teams, usually with three students in each team. The set of deliverables includes technical documents such as requirements document, design diagrams, code and test cases, as well as managerial documents related to meeting logs, project plan, cost estimation and team members evaluation.

The management course was taught in different formats over the years by using different life cycle models, various tools and technologies, and by selecting appropriate projects that train the students towards the job market. The rest of the chapter describes the various techniques the author used in teaching the course.

BACKGROUND

The importance of project management skills for software engineers has been extensively discussed in many books and articles.

Software Engineering Management has been listed as one of the knowledge areas of software engineering in the Guidelines for Graduate Degree Programs in Software Engineering (GSwE, 2009), and in the Guide for Project Management Body of Knowledge (PMBOK, 2011). The following topics are included under Software Engineering Management (GSwE, 2009):

- Software Project Planning
- Risk Management
- Software Project Organization and Enactment
- Review and Evaluation
- Closure
- Software Engineering Measurement
- Engineering Economics

While the topics seem to cover all aspects of project management, teaching these topics in a software engineering course is always a challenge. A first-hand experience in this context was given by McDonald (2000) who taught project management courses both to industries and in academia. In this paper, McDonald focused on the differences between industrial workshops and academic courses and concluded that there is more freedom and time in academic environment.

Kruchton (2011) describes his experience in following the project management guidelines while teaching the project management course to industries and in academic settings. In particular, he indicates that the guidelines assume a waterfall-like life cycle model and needs to be revised to accommodate more advances in software development such as agile method. This is because models such as Agile method are quite different from the traditional models such as waterfall and incremental prototyping. The differences in life cycle models require significant changes in expectations from the students, deliverables and evaluation of students.

Koolmanojwang and Boehm (2011) describe how teaching software engineering should be elevated to system engineering by bringing in some of the topics shown in the guidelines. Their goal is to ensure that system engineers should be capable of performing cost estimation, business

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