Chapter 68
On the Nature of Collaborations in Agile Software Engineering Course Projects

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ABSTRACT

If there is a constant in software development, then it is that its ecosystem is a variable. The agile methodologies are part of a relatively recent shift from predictive to adaptive approach towards software development. This change has had a notable impact on software engineering education (SEE). In this article, a glimpse into the state-of-the-art of incorporating agile methodologies in software engineering courses is presented. In doing so, the reasons for including a project component in software engineering courses, and for committing to agile methodologies in software engineering projects in those courses, are given. The significance of collaboration in the execution of agile methodologies, in general, is underscored, and the pivotal role of collaboration in agile course projects, in particular, is emphasized. To lend an understanding to the notion of collaboration in agile methodologies, a conceptual model for collaboration is proposed and elaborated. The types of collaborations that can occur in agile course projects are classified and discussed. The use technological means for facilitating collaboration, including the Social Web and especially the Wiki, is highlighted.

INTRODUCTION

The increasingly significant role of software in society, and that of software development in industry, has led to attention by educational institutions and professional organizations towards software engineering education (SEE). There are a number of Universities around the world that offer courses, and even entire programs, related to software engineering. There are also a number of initiatives by professional organizations towards 'standardization' of SEE-related bodies of knowledge and curricula.

The context of SEE comprises a number of elements (Shaw, 2000), including the external, constantly evolving, industrial environment. In the past decade, there have been a number of notable changes in industrial software engineering, including the movement towards agility (Highsmith, 2009). The prospects offered by agile methodologies are also associated with unique challenges towards software development, and effective collaboration (Whitehead, 2007) among stakeholders is one of those challenges. For the sake of this article, a stakeholder is a person, a group, or an organization that has interest in a course project for some reason, and a team is an indecomposable unit of "a small number of people with complementary skills who are committed to a common purpose, performance goals, and approach for which they hold themselves mutually accountable" (Katzenbach & Smith, 1992).

The unique nature of software engineering as compared to other engineering disciplines calls for special attention on SEE. In this article, the interest is in understanding and exploring the manifestations of collaboration in agile course projects. In many disciplines, including investigative journalism, the Five Ws (and one H) are regarded as basic questions (or dimensions) in information gathering. In the context of this article, these questions can be posed as follows: What (is collaboration), Why (is collaboration necessary), Who (is involved in collaboration), Where (does collaboration occur), When (does collaboration occur), and How (does collaboration occur). In this article, the answers to these questions are pursued to varying extent.

The rest of the article is organized as follows. First, background and previous work relating team projects, agile methodologies, and collaboration in the context of SEE is considered. This is followed by a study aimed towards understanding the essential role of collaborations in agile course projects, and social, organizational, and technological means for facilitating such collaborations. Next, directions for future research are highlighted. Finally, concluding remarks are given.

BACKGROUND AND RELATED WORK

In this section, arguments supporting the inclusion of projects in SEE are given, and the current state of commitment to agile methodologies in SEE is analyzed.

Motivation for Projects in Software Engineering Education

In software engineering courses, it is customary to have a project component. In general, a project could be carried out individually or communally. However, for a number of reasons, the course projects are often carried out in a team (Hayes, Lethbridge, & Port, 2003; Devedžić & Milenković, 2011; Mahnic, 2012).

Realization of Active Learning

There are a number of theories of learning, of which constructivism (Hadjerrouit, 2005) and, based on it, active learning (Hazzan, Lapidot, & Ragonis, 2011), are applicable to SEE because of the nature of software engineering. The premise of active learning is that repetitive, rote memorization should be discouraged, and that opportunities for creativity (Paulus & Nijstad, 2003) and collaboration should be encouraged. This evidently requires that the students are engaged in practical knowledge that they can apply in the 'real-world'. In SEE, one way to realize active learning is through team projects.

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