

## Chapter 3

# Towards an Understanding of Collaborations in Agile Course Projects

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### ABSTRACT

*The agile methodologies are part of a shift from predictive to adaptive approach towards software development. This change has had a notable impact on Software Engineering Education (SEE). In this chapter, 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 courses, are given. To lend an understanding to the notion of collaboration in agile methodologies, a conceptual model for collaboration is proposed and elaborated. The pivotal role of collaboration in agile course projects is emphasized. The use of certain means for facilitating collaboration, including the Social Web, is discussed.*

### 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, as

well as 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 of 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,

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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.

The interest in this chapter is in 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 chapter, 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 chapter, the answers to these questions are pursued to varying extent.

The rest of the chapter is organized as follows. First, background and previous work relating course projects, agile methodologies, and SEE is considered. This is followed by a discussion aimed towards understanding the essential role of collaborations in agile course projects. Next, directions for future research are highlighted. Finally, concluding remarks are given.

## **BACKGROUND**

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 collectively. 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. 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.

### **Improvement of Scale**

There are inevitable limits on the mental and physical abilities of a single person that prevent that individual to sole-develop software systems with certain characteristics in a given duration. The team projects allow the development of software systems with large size and/or complex domains, much like those that the students may come across in professional settings.

### **Instillation of Soft Skills**

In recent years, soft professional skills have been recognized as being necessary in engineering (Surakka, 2007; Soundararajan, Chigani, & Arthur, 2012; Sedelmaier & Landes, 2013), but often addressed inadequately in standard curriculums (Kovitz, 2003; Mohan et al., 2010). The team projects act as a vehicle for students to rely upon and learn from each other. They also instill the habit among students of working with others over long periods of time. In particular, collaboration is viewed as a soft professional skill (Tabaka, 2006;

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