Chapter 26
A Social Web Perspective of Software Engineering Education

Pankaj Kamthan
Concordia University, Canada

ABSTRACT

The discipline of software engineering has been gaining increasing significance in computer science and engineering education. A technological revitalization of software engineering education requires a considerate examination from both human and social perspectives. The goal of this chapter is to adopt a systematic approach towards integrating Social Web technologies/applications in software engineering education, both inside and outside the classroom. To that regard, a pedagogical patterns-assisted methodology for incorporating Social Web technologies/applications in software engineering education is proposed and explored. The potential prospects of such integration and related concerns are illustrated by practical examples. The directions for future research are briefly outlined.

INTRODUCTION

It could be said that today's civilization runs on software and will likely continue to do so in the foreseeable future. It is therefore natural to devote much attention to the life of software from its inception to its operation and eventually its retirement, and software engineering is the discipline that does that. As software engineering matures, its body of knowledge is shared, communicated, and consumed. Indeed, in the last decade, software engineering has been playing an increasingly prominent role in computer science and engineering undergraduate and graduate curricula of Universities around the world (Rezaei, 2005; Surakka, 2007).

As with other disciplines, software engineering education (SEE) needs to be sensitive to the variations and evolution of the social and technical environment around it. In particular, any changes in the information technology (IT) environment and the

generation of students making use of it (Palfrey & Gasser, 2008) need to be reflected in SEE, if it leads to viable opportunities and demonstrated benefits. There have been calls for a reform of SEE in which technology is given a prominent place (Frailey, 1998; Shaw, 2000; Lethbridge, 2000). However, there have been relatively few efforts (Kamthan, 2008b) in the direction of precisely and objectively articulating the integration of IT in SEE.

The Social Web, or as it is more commonly referred to by the pseudonym Web 2.0 (O'Reilly, 2005; Shuen, 2008), is the perceived evolution of the Web in a direction that is driven by 'collective intelligence,' realized by IT, and characterized by user participation, openness, and network effects. Web 2.0 differs from its predecessor, the so-called Web 1.0, in many ways (Cormode & Krishnamurthy, 2008) including legal, social, and technical dimensions.

The focus of this chapter is to assess the implications of the Social Web as it pertains to teaching and learning of software engineering (Kamthan, 2009), including synergistic interactions between teachers and students. The focus is on pedagogical affordances of the Social Web for SEE. The rest of the chapter is organized as follows. First, the background necessary for later discussion is provided and related work is presented. This is followed by a proposal for a systematic introduction of the Social Web environment consisting of technologies/applications for SEE, labeled as SW4SE2. The prospects of SW4SE2 are illustrated using practical examples. Next, challenges and directions for future research are outlined. Finally, concluding remarks are given.

BACKGROUND

In this section, the human and the social aspect of software engineering is briefly traced, and the role of IT in realizing it in practice is outlined.

An Overview of the Human and Social Aspects of Software Engineering

In the past decade, there has been shift in the theory and practice of software engineering in a few notable directions, one of which is the acknowledgement of the significance of the role of non-technical aspects. In particular, it has been realized that there is a need to foster a social environment in software engineering at several different levels, and this is also increasingly being seen as significant to SEE (Layman et al., 2005). This acknowledgement has come at multiple levels, of which people and process are two critical, interrelated elements.

People

In general, large-scale software development is conducted in teams. The nature of software teams is fundamentally *social* in which the principles for fostering cooperative behavior (Tenenberg, 2008) including that for face-to-face communication, repeatability and reciprocity of interactions, mutual monitoring, and acquiescence/sanctions apply.

The premise to any software development is *ethics*, which is a human value. Indeed, all pertinent decisions, including software quality concerns (Kamthan, 2008a), are 'driven' by ethical considerations aiming to develop software for the benefit of the society at-large.

Process

For development of software aimed for the general public, the industry has essentially rejected bureaucratic process environments that discourage social interaction. In recent years, the software process environments have become increasingly collaborative (Williams, 2000), embracing the client and user involvement. Indeed, agile methodologies and Open Source Software (OSS) ecosystems are exemplars of this movement.

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