

# Chapter 3

## Using the Social Web Environment for Software Engineering Education

**Pankaj Kamthan**  
Concordia University, Canada

### ABSTRACT

*The software engineering educational system influences, and is influenced by, a number of social and technical factors of the ecosystem in which it resides. The Social Web environment includes a number of technologies and applications based on those technologies. The aim of this chapter is to examine a technological revitalization of software engineering education (SEE) from the perspective of the Social Web. In doing so, a systematic approach towards integrating the Social Web environment in SEE is explored. The potential prospects and associated concerns of such integration, both inside and outside the classroom, are illustrated by a number of practical examples.*

### INTRODUCTION

The discipline of software engineering is integral to computer science and engineering education and, as a result, given increasingly prominent role in undergraduate and graduate curricula of Universities around the world (Rezaei, 2005; Surakka, 2007). There are a number of directions of evolution of the software engineering education (SEE), and the information technology (IT) is one

of them (Frailey, 1998; Shaw, 2000). In particular, any changes in the IT environment need to be reflected in SEE, if it leads to viable opportunities and demonstrated benefits (Kamthan, 2008).

The Social Web, or as it is more commonly referred to by the pseudonym Web 2.0 (O'Reilly, 2005), 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. For the sake of this chapter, the Social Web *environment* includes Social Web technologies, applica-

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tions based on those technologies, and tools for managing both. The social aspects of software engineering has been known since the early 1970s (Weinberg, 1998), and have been reinforced in recent years (Ahmadi et al., 2008; De Souza et al., 2009; Nørbjerg & Kraft, 2002). The focus of this chapter is to assess the implications of the Social Web environment as it pertains to logistical and pedagogical issues arising in teaching and learning of software engineering, including interaction between teachers and students, and between students.

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 methodology (labeled as SW4SE2 henceforth) that aims for a systematic introduction of the Social Web environment in SEE, both inside and outside the classroom. SW4SE2 is then illustrated using a number of practical examples. Next, challenges and directions for future research are outlined. Finally, concluding remarks are given.

## BACKGROUND AND RELATED WORK

In this section, a number of elements of the SEE ecosystem are considered, and the work related to this chapter is briefly analyzed.

### The New Generation of Software Engineering Students

The body of students in software engineering, as in other disciplines, is neither homogeneous, nor static. There are a number of catalysts and dimensions that have led to behavioral changes in software engineering students over the years, and the one that is especially relevant to this paper is technology.

A person who was born at the time digital technologies were taking shape and/or has grown

up with digital technologies has been termed as a *digital native* (Palfrey & Gasser, 2008; Prensky, 2001). The period in question is 1980 or later. The digital technologies include those that underlie the current non-stationary computing devices, and those that are related to the Internet in general and the Web in particular. From a demographical perspective, digital natives belong to Generation Y.

There are a number of defining characteristics of (software engineering) students that are digital natives (Bernsteiner, Ostermann, & Staudinger, 2008; Ras & Rech, 2009; Tapscott, 2009): they are avid users of notebook computers and/or mobile devices, they are well-connected to each other via distributed computer networks, and they rely more on electronic rather than other means of information.

It is likely that the Social Web technologies are increasingly ‘transparent’ to this new generation of students and the use of Social Web applications comes naturally. In other words, Generation Y may change the perception of technological determinism in education in general and SEE in particular.

### Digital Natives and Technological Determinism

In education, there has been number of arguments against *technological determinism*, a reductionist theory that presumes technology as the basis for all human activity. In particular, there is objection to assertions such as the following: it is the absence of technology that is the root cause of an educational problem, that the presence of a certain technology will solve of an educational problem, and so on.

However, the rise of digital natives may change this traditionally held view. The number of software engineering students that are digital natives is not likely to decrease in the future, and SEE should be sensitive to the hardware and software technologies being used by the students at a given point in time. The technological infrastructure of

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