Using Wiki for Agile Software Development

Pankaj Kamthan
Concordia University, Canada

Nazlie Shahmir
WestJet Airlines Ltd., Canada

INTRODUCTION

To remain relevant, the methodologies for software development need to be sensitive to the changes in business preoccupations, engineer aspirations, and user expectations. The agile methodologies are part of a shift from predictive to adaptive approach towards software development (Highsmith, 2009). It has been shown in a number of studies that agile methodologies are being increasingly deployed in many organizations of different sizes, for a variety of application domains, for software projects with teams that are geographically-collocated or, more recently, geographically-dispersed (Brown, 2012).

The ability to manage content is important for any organization (Schneider, 2009), and doing so can be a critical difference between success and failure of a software project. It is therefore crucial to explore and examine means that can effectively and economically manage content during agile software development, while preserving the human-centered and socially-oriented characteristics of agility. The purpose of this article is to understand and to explore the use of *Wiki* (Leuf & Cunningham, 2001) for managing the content that is created, communicated, and consumed in agile software development, from the perspectives of software engineering as well as that of the *Social Web* (O'Reilly, 2005).

The rest of the article is organized as follows. First, background and previous work relating agile methodologies and Wiki, historically and otherwise, is discussed. This is followed by introduction of a conceptual model for integrating Wiki in agile software development and presentation of representative examples illustrating the conceptual model. Next, directions for future research are highlighted. Finally, concluding remarks are given.

BACKGROUND

The genealogies of agility and Wiki are, perhaps unsurprisingly, not mutually exclusive. This section provides a brief glimpse into the history and evolution of both agility and Wiki, with an emphasis on the interplay, as necessary.

The origins of agility date back to the 1950s (Larman & Basili, 2003), although the underlying ideas, such as that of piecemeal growth and prototyping, became noticeable only after the rise of software engineering as a profession and large-scale commoditization of software. In the 1990s, a number of limitations of rigidity in approaches for the development of certain types of software systems were realized. The drive to cope with these limitations led to the inception of agility. The *Agile Manifesto* characterizes the term "agile" and provides a vision for agile software development. It constitutes the basis for a number of agile methodologies, the collection of which continues to evolve, including *Crystal Clear*, *Dynamic Systems Development Method* (DSDM), *Extreme Programming* (XP), *Feature-Driven Development* (FDD), *Open Unified Process* (OpenUP), and *Scrum*. According to periodic surveys conducted by *IBM* and *VersionOne* over the years, XP and Scrum are among the agile methodologies currently in common use. The agile methodologies have garnered support in national and international standards, such as the ISO/IEC/IEEE 26511 Standard, the ISO/IEC/IEEE 26515 Standard, and the ISO/IEC/IEEE 29148 Standard. An agile methodology is usually equipped with a process that outlines how the development of software should proceed over time. An agile process usually consists of time-boxed iterations. For those responsible for managing an organization, the selection of, or a transition to, an appropriate agile methodology is a crucial issue from the standpoint of strategic management (Moreira,

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2013). However, addressing this crucial issue in detail is beyond the scope of this article.

The origins of Wiki date back to the 1940s (Bush, 1945), although the underlying ideas, such as that of collective intelligence and hypermedia, became prominent only after the invention of computer networks and the pressing need for large-scale content management in organizations. In the 1990s, the use of patterns in software engineering was gaining acceptance; however, existence of a means to collaboratively author and globally disseminate patterns continued to be a challenge. This changed with the advent of the Web, followed by the introduction of technologies that could support server-side programming for a client-side delivery, and led to the inception of Wiki (Leuf & Cunningham, 2001; Ebersbach, 2008; Deans, 2009). There are a number of technologies and tools responsible for a Wiki, of which the most significant is a *Wiki system*. The Wiki systems have evolved over the years, and currently there are a number of contenders in the market, many of which are available as *open source software* (OSS) for a variety of commonly-used operating systems. For example, *MediaWiki* and *TWiki* are among the Wiki systems currently in common use. A Wiki system may also be installed remotely as a hosting service. For example, *Wikia* and *Wikispaces* are among the Wiki hosting services currently in common use. There are also certain agile project management systems, such as *ThoughtWorks Mingle*, issue tracking systems, such as *Atlassian JIRA*, and acceptance testing frameworks, such as *FitNesse*, that provide native support for Wiki.

There have been relatively few reports, in academia or in industry, on the use of Wiki in agile software development. In 2006, connection between Wiki and agile software development was drawn (Cunningham, 2006), as shown in Table 1.

Table 1. A mapping between agile software development and Wiki

	Agile	Wiki
Correction	Risk	Knowledge
Barrier	Plan	Privilege
Team	Location	Attention
Serves	Customer	Reader

The potential for interplay between agility and Wiki is apparent in the AGILE LIFECYCLE pattern (Mader, 2008). A conceptual model for the agile project management, abbreviated as *APM*, has been proposed (Highsmith, 2009) and followed (Cobb, 2011). The APM provides an *Envision-Speculate-Explore-Adapt-Close* structure of executing and adapting a software project that follows an agile methodology. However, APM is not a standard and is not general in its scope (as it is oriented towards Scrum). Using a survey as an instrument, the relevance of Wiki for collaborative knowledge management has been assessed and the characteristics of Wiki users have been given (Hester, 2010). The uses of Wiki for user story education, both inside and outside a classroom, have been given (Fancott, Kamthan, & Shahmir, 2012). As part of the solution of the WORK TOGETHER enterprise architecture pattern, the use of Wiki in setting-up a collaboration space has been suggested (Perroud & Inversini, 2013). Finally, using an integrated knowledge management life cycle, a starting point for the confluence of agile software development, knowledge management, and Wiki has been outlined (Kamthan, 2013).

A Conceptual Model for the Use of Wiki for Managing Content in Agile Software Development

For a systematic integration of Wiki in agile software development, a conceptual model, as shown in Figure 1, is proposed. This conceptual model is independent of any agile methodology. It is evident from Figure 1 that Wiki is perceived as a kind of resource that assists other elements of agile software development.

The aim of this conceptual model is to provide an understanding of the salient elements of agile software development that can serve as entry points in such integration. These elements along with their interrelationships are inspired by the different viewpoints of software engineering given by the *IEEE Software and Systems Engineering Standards Committee*. It is possible to further analyze, granularized, and describe each element to make the conceptual model specific to the context of an organization. For example, the composition of the agile team, type of the agile process, or the application domain of the agile product could be considered.