A Vertical Approach to Knowledge Management: Codification and Personalization in Software Processes

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ABSTRACT

Software process improvement is a practical concern in software companies today and it has been addressed in research. Part of this research has applied a knowledge management perspective. Researchers point out that two different strategies exist where a mixture is difficult to maintain: Personalization (focus on people and their collaboration) and codification (focus on documents and their accessibility). This paper addresses different knowledge management problems of a software company and how they can be alleviated. A prototype, which distinguishes between different organizational levels (e.g., software managers and software developers) and applies different knowledge management strategies, was built. It consists of a wiki and an enterprise system. This article shows how each part of the system focuses on one of the strategies and describes the differences for tool support. This combination could be beneficial because the connection between the two different parts of the prototype works. Further implications for practitioners are explained.

Keywords: Codification, Knowledge Management, Personalization, Software Management, Software Process Improvement

INTRODUCTION

Software process improvement (SPI) became interesting for many companies searching for a way to improve the operational quality. According to Aaen et al. (2001) are there three different approaches for SPI: Evolution, norm and commitment. The norm-driven approach to SPI is a way to adopt the existing norms and the commitment-driven approach stresses the active support with attention and resources of the senior management. The evolutionary approach includes incremental changes based on experiences of previous executions, like the IDEAL model, which organizes the whole process in five phases: Initiating, diagnosing, establishing, acting and learning (McFeeley, 1996). Researchers often focused on small and medium-sized companies, as these seem to face the changing environments more often than larger ones. The changing circumstances need to be matched by changed processes in order to stay successful (Ward, Fayad, & Laitinen,
Kautz (1998, 1999) studied three small companies according to their process improvement. He points out four critical success factors: a tailored approach, functioning networking, external assistance and external financial support. A different study addresses problems with current software processes through problem diagnosis, i.e., the software developer’s own perception of problems and their commitment (Iversen, Nielsen, & Norbjerg, 1999).

Even though SPI differs from case to case, a fundamental part in all of these reports is the sharing of knowledge and/or experience, referred to as knowledge management (KM). The different modes of organizational knowledge creation (Nonaka, 1994) were analyzed by Arent and Norbjerg (2000) in an SPI context, stating that an organization’s software practices are based on the software developers’ and managers’ knowledge. Mathiassen and Pourkomeylian (2003) point out that a KM strategy has to fit to an SPI approach in order to succeed.

Generally, the implications on KM can be derived from the six different perspectives of knowledge: Personalized information, understanding, object, process, access and capability (Alavi & Leidner, 2001). Deducing from these, researchers distinguish between two knowledge management strategies: the personalization strategy and the codification strategy (Hansen, Nohria, & Tierney, 1999). While personalization focuses on people and provides possibilities to share their knowledge (person to person), the codification strategy focuses on documents and provides possibilities to write down and store information as well as for others to access it (people to documents to people). KM is a field that has been addressed by researchers from many different angles, but also industry has reacted with a large variety of tools, specialized for different approaches (Rus & Lindvall, 2002). Widespread examples would include wikis and enterprise systems (ES). Wikis are collaborative knowledge tools that allow the user to create and edit hypertext pages. Being very simple to use with hardly any restrictions for the users, wikis are considered as supportive tools for the personalization strategy (Wagner, 2004). ES on the other hand assist a company operationally by integrating data for use in the whole organization. They can record data, store and access content of many different backgrounds in an equal form and are thus supporting the codification strategy (Davenport, 1998).

In this article we explore the distinction between the codified and personalized KM strategies for SPI and in particular how knowledge tools and systems can support the strategies. We envisage support in different kinds of systems according to the dilemma of the strategies at different organizational levels. We introduce a prototypical system that we have implemented, based on these considerations. Our contribution is a layered strategy to combine oppositional strategies on different organizational levels to a combined KM strategy, which the prototype follows.

The rest of the paper is organized as follows: In the next section we describe the two KM strategies in more detail. Then we sum up the requirement for KM in our case company, followed by the design of our prototype. Afterwards we briefly present the results of our evaluation. We then discuss our approach and the impact on the company followed by the conclusion in the final section.

**KNOWLEDGE MANAGEMENT STRATEGIES**

Hansen et al. (1999) analyzed different consulting companies and explained two different strategies for KM that they found. The bottom line is that the KM strategy of a company has to fit to its competitive strategy. However, a knowledge management strategy is not only addressing the company level, even internally departments or services can differ in strategic orientation (Mathiassen & Pourkomeylian, 2003). In the following we describe the two strategies in detail, based on the two sources mentioned (Hansen, Nohria, & Tierney, 1999; Mathiassen & Pourkomeylian, 2003). Additionally we explain cases and give examples for supporting tools. A broader overview for KM
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