Chapter XIII

Knowledge at Work in Software Development: A Cognitive Approach for Sharing Knowledge and Creating Decision Support for Life-Cycle Selection

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Abstract

Knowledge management practices in software development and engineering have been focused mainly on knowledge sharing and maintenance whereas less attention has been devoted to knowledge elicitation and codification issues. In this chapter we present a methodology based on causal mapping for the investigation and management of knowledge created and elaborated by software development teams in the production of new software applications. The chapter focuses on the early stages of the process.
when development teams have to make a choice regarding the software life cycle model that best fits, given constraints concerning ambiguity of the requirements, risks, costs evaluation and scheduling. A step-by-step application of the proposed methodology to a case study in a software company is presented to provide the reader with examples drawn from the field analysis and illustrates critical methodological aspects. Implications for knowledge management in software project development are then outlined and discussed.

**Introduction**

This chapter can be positioned within the research on Knowledge Management in software development (see the special issue IEEE Software, 2002). Typical knowledge management tasks such as knowledge storing, elicitation, codification and re-use have always been relevant issues in the management of projects of new software products. However recent literature explicitly emphasizes the necessity of a systematic approach to knowledge management in software development and engineering through sound methodologies and support tools aimed at facilitating knowledge acquisition, generation, diffusion, exploitation and maintenance, according to the principles of the knowledge value chain (Figure 1).

Managing knowledge within knowledge-intensive organizations such as software firms requires companies to have suitable methodologies and tools for each phase of the knowledge value chain.

Traditionally, knowledge management practices in software development and engineering have been focused mainly on knowledge sharing and maintenance whereas less attention has been devoted to the elicitation issues. Actually, the acquisition step is one of the most critical steps in the knowledge value chain. In particular, this chapter focuses on knowledge acquisition from internal sources such as technicians and managers involved in the development of a new software product. Often being situated, tacit, and idiosyncratic, individual knowledge is not easily captured and transformed into organizational knowledge, which is largely shared and easily accessible to other organizational members (Argyris & Scöhn, 1978; Choo, 1998; Choo & Bontis, 2002; Nonaka & Takeuchi, 1995).

Instead of a software engineering approach to knowledge management, that is rather focused on the management of explicit knowledge, in this chapter we propose the adoption of a knowledge engineering approach, which is usually employed in the design

**Figure 1. The knowledge value chain**

![Knowledge Value Chain Diagram](adapted/elaborated from Schreiber et al. (2000))

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