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Capturing and managing knowledge using social software and semantic web technologies

Angelo Di Iorio*, Davide Rossi

Department of Computer Science and Engineering, University of Bologna, Mura Anteo Zamboni 7, Bologna 40127, Italy



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ABSTRACT

It has often been claimed that implicit knowledge is the most important kind of knowledge within organizations. The surge of social software offers new ways to elicit and diffuse this kind of knowledge. Social software also proved to be effective knowledge management instruments, particularly when combined with semantic web technologies. The logical next step - supporting the management of implicit knowledge by using semantic web-enabled social software—has been only episodically explored. In this article we present KnowBest, a platform based on social software and semantic web tools to manage a specific class of implicit how-to knowledge in organizations. Our approach leverages social software intrinsic characteristics and extends them to allow for both knowledge and its structure to emerge and be collectively managed in a cooperative way using online tools with simplified interfaces. We use semantic web technologies to externalize implicit knowledge and enable reasoning on the knowledge base; we exploit reasoning within the platform itself in the form of a semantic recommender that is meant to enhance the ability of the users to find documented practices possibly related to the work they have at hand, affecting positively internalization too.

We performed an evaluation in the context of a specific case study collecting feedbacks from users and showing that KnowBest can be successfully deployed to effectively promote how-to knowledge circulation within a community.

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1. Introduction

The advent of Enterprise 2.0, that is the use of Web 2.0 applications not just for personal interest but to carry out work-related activities as well, is affecting organizations [23,39]. In particular, it affects the way knowledge circulates within organizations and changes its nature. Two main categories are traditionally used to classify knowledge: *tacit* and *explicit*. The concept of tacit knowledge has been primarily introduced by Polanyi in the late sixties [29]. His “we know more than we can tell” assertion summarizes the main characters of tacit knowledge: unarticulated and tied to the senses, movement skills, physical experiences, intuition, or implicit rules of thumb. The explicit knowledge, on the other hand, is formalized and can be written down, transferred and interpreted.

Nonaka described a conceptual model of the interplay between tacit and explicit knowledge known as SECI (Socialization, Externalization, Combination, Internalization) [24]. A cornerstone in the work of Nonaka is the concept of *knowledge conversion*, a process by which knowledge mutates its nature from tacit to explicit and vice versa. In the SECI model *social-*

* Corresponding author.

E-mail addresses: angelo.diiorio@unibo.it, diiorio@cs.unibo.it (A. Di Iorio), rossi@cs.unibo.it (D. Rossi).

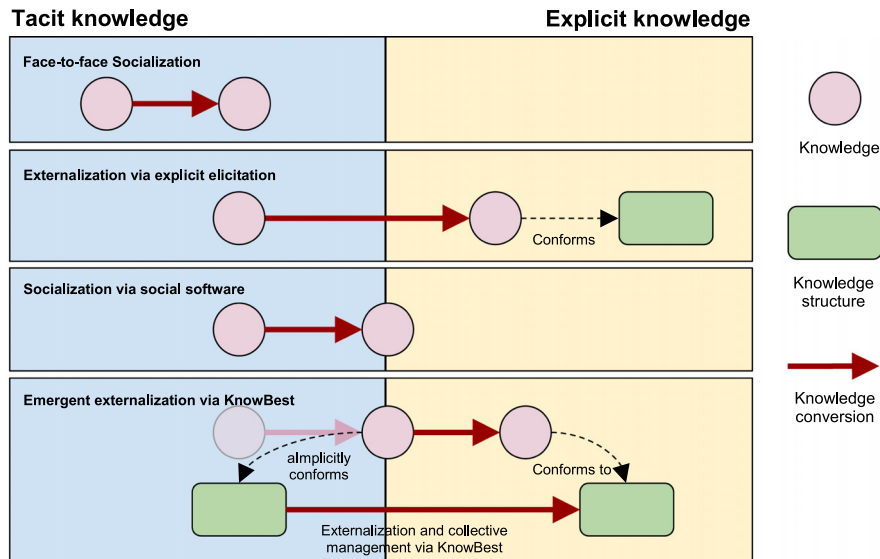


Fig. 1. Conceptual framework: different forms of externalization.

ization is where tacit knowledge is shared among members of the organization; this usually happens through face-to-face communication or shared experience (such as apprenticeship). *Externalization* is where knowledge becomes explicit: it can be shared and form the basis for new knowledge. The next phase, *Combination*, describes the processes by which the explicit knowledge is collected from inside or outside the organization and exploited to form new knowledge. Finally, *Internalization* indicates the practices by which explicit knowledge is transformed into tacit knowledge, and becomes part of an individual's knowledge. Nonaka argues that knowledge is not only purely tacit or purely explicit but that knowledge exists in the continuum included between these two boundaries.

If we refer to the SECI concepts, we can observe that social software has an impact on most of the dimensions outlined by the model [3,4,16]; this is most evident for socialization and externalization. As its own name implies a fundamental characteristic of social software is its ability to support and promote socialization; moreover when socialization takes place via social software the conveyed knowledge has to be expressed in a digital representation; albeit this representation is usually not formalized. In this respect social software is an enabling technology to promote emergent mechanisms for tacit knowledge sharing that also incentivizes its representation, easing its conversion to an explicit form. This representation, however, is usually poorly structured and hard to manage, so while it emerges as explicit it is not fully externalized.

The tension between strengths and weaknesses of social software tools for knowledge conversion has been largely investigated in the literature. An exhaustive survey focusing on tacit aspects of knowledge can be found in the works of Panahi et al. [26,27]. Several researchers claimed that social Web tools are facilitators for knowledge sharing, in particular for the tacit one; others, on the other hand, showed limitations of these tools: for instance, these tools lack body language or eye contact and make users feel remotely connected, with the risk of making them perceive a lack of psychological safety and trust. Different theoretical models have been proposed over the years and have been exploited to study knowledge conversion in several domains.

More than focusing on cognitive and psychological aspects, this paper presents a novel framework that enables such knowledge conversion by leveraging social Web tools. The framework is called KnowBest and includes both a conceptual model and a working implementation.

The key feature of KnowBest is the combination of social software with semantic web technologies to ease the management and the full externalization of the knowledge that emerges using Web 2.0 tools. Fig. 1 summarizes the knowledge conversion processes we focus on and the role of KnowBest in this context. Circles represent knowledge and rounded rectangles represent its structure. Red arrows indicate the transition of knowledge from one status to another, while dashed ones indicate the connection between the knowledge and its structure.

In the upper compartment face-to-face socialization is depicted: knowledge flows between individuals but is kept in the tacit domain. The "Externalization" compartment depicts common knowledge management practices in which knowledge is elicited from experts (usually in the form of interviews) and stored in a knowledge management system with a well-defined structure. The third compartment, "Socialization and Externalization via social software", shows that the use of Web 2.0 tools promotes an explicit representation of the knowledge that, however, is not fully externalized since it lacks structure. "Emergent externalization via KnowBest", the last compartment, shows our proposal: we extend socialization via social software with simple mechanisms, based on social software as well, to fully externalize both knowledge and its structure. Social software provides its intrinsic ability to promote knowledge elicitation (represented by the transparent circle on the

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