Task–Based Knowledge Management

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INTRODUCTION

In modern organizations, the major role of knowledge management is supporting knowledge work. The concept of knowledge work assumes not only task performance, but also the review and evaluation of the work done in order to understand and learn from the experience. Knowledge work relies on a body of knowledge to support processes that address both the performance of work and the intellectual aspects of the work activity (Zuboff, 1988). In this sense knowledge management becomes one of the most important mechanisms in implementing such support. In this article we present task-based knowledge management (TbKM) as an alternative approach to knowledge management (KM).

BACKGROUND

Most KM approaches focus on organizational knowledge and/or organizational processes and their management (e.g., Davenport & Prusak, 1998; Tiwana, 2000; Awad & Ghaziri, 2003). The TbKM approach addresses the management of knowledge work rather than knowledge. It is a bottom-up approach that focuses on the practicalities of work activities, as performed by individuals and groups. Thus TbKM is directed to supporting both:

• task performance to achieve organizationally defined outcomes; and
• work practices of actors including the generation and collection of experiential knowledge associated with task performance, as well as single- and double-loop learning (Argyris & Schön, 1978).

The focus of TbKM is not directed towards automating any work practice. Task-oriented methods for knowledge-based systems were proposed in artificial intelligence projects to automate problem solving and reasoning by representing knowledge in a computable form (Chandrasekaran & Johnson, 1993). These approaches relied on capturing all organizational knowledge related to the task and creating a formally defined knowledge repository (Schreiber, Welinger & Breuker, 1993).

The TbKM approach provides an infrastructure for knowledge work where knowledge is a by-product of task performance. This infrastructure allows the knowledge worker to document the task instances in a way that is shareable with other actors performing that task. Thus TbKM is essentially an implementation of a knowledge work support system (KWSS) that systemically preserves knowledge of each instance of the task in a dynamic memory system. In order to support knowledge work, this memory includes the pragmatic outcomes as well as the knowledge created through task performance. Effective utilisation of this memory is facilitated by TbKM functionality such as reasoning, memory aids, explanation facilities, and learning capability. Moreover, the TbKM approach is consistent with reflective practice in that actors are encouraged to reuse and create knowledge through learning as an integral part of the task (Schön, 1991).

The task-based approach has been formalised as a theoretical framework that underpins our research. This approach has been used as an evolving framework analytically to diagnose research settings and determine the aspects of focus. Additionally, the framework has also been the core of the conceptual design for prototyping KM systems and KM development programs.

The task-based approach to knowledge management has evolved from a wide range of projects that have been undertaken and the practical requirements imposed by industry collaborators (Burstein & Linger, 2003, 2002; Linger & Burstein, 2001; Linger, Burstein, Zaslavsky & Crofts, 1999; Linger, Burstein, Ryan & Kelly, 2000; Fennessy & Burstein, 2000).

MAJOR ELEMENTS OF THE TASK-BASED APPROACH TO KNOWLEDGE MANAGEMENT

The TbKM approach focuses on knowledge work, not knowledge as the object of knowledge management. Thus the major elements of this approach are:
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- a task focus
- a task-based model of knowledge work
- a community of practice
- an organizational memory
- task outcome
- knowledge work support

Task Focus

Underlying the TbKM approach is the focus on work practice. The approach aims to explore how the work is actually done, not how it is meant to be done or what individuals say they do. In this context, a task:

_is a substantially invariant organizational activity with outcomes that include tangible outputs that are central to the organization’s viability and the internal outcomes that are potential drivers of organizational change._ (Burstein & Linger, 2003, p. 290)

In terms of this article, no distinction is made between an (organizational) activity and task, and the terms are used interchangeably unless indicated otherwise. Organizational activity, as used here, derives from Situated Activity Theory proposed by Livari and Linger (1999, 2000) to characterize knowledge work. Such activity differs from the actions of individual actors, as the scope of the activity requires a number of actors for its completion.

For example, weather forecasting is organised around shifts that involve a number of forecasters. Each forecaster is given responsibility for particular forecast products, but each product needs to be consistent with the forecast policy that is set collectively by the shift. This example also highlights that such activity is socially situated in that all actors collectively engage in processes that enable them to gain a shared understanding of the activity. It is this understanding that enables each actor to intentionally complete their activity. Since the activity outcomes are organizationally determined, the actors’ shared understanding of the activity also includes their understanding of the organizational imperatives that underlie the activity.

Task-Based Model of Knowledge Work

Task models produced for knowledge-based systems (KBS) development (see for example, Duursma, 1993) mapped the task into a generic task category (Chandrasekaran, Johnson & Smith, 1992). The intention was to generate a computational procedure based on Generic Task model represented as a hierarchical or tree model, including tasks, methods, and subtasks (Chandrasekaran & Johnson, 1993), that intended to mimic an expert’s performance.

Such formal problem-solving methods are based on task structures that attempt to fully represent the problem-space and produce fully computable knowledge-level descriptions. For example, KADS and KADS-II European projects came up with a four-layered model of problem-domain knowledge (Schreiber et al., 1993). Although such knowledge-level descriptions made a major contribution in their analysis of task-oriented approaches to knowledge modelling, in many practical contexts the normative algorithms for solving real problems are “less useful than they seem” (Chandrasekaran & Johnson, 1993, p. 52).

The TbKM approach departs from the idea of generic representation of the task and its context. Organizational work, the task, is represented as two nested layers. The pragmatic represents actual work practice and the work that needs to be done. It is associated with the performance of the task, and is concerned with the efficient and effective execution of the task. The conceptual layer views the task from a more generalised, abstract perspective, expressed in terms of the overall goals and objectives of the task and related concepts and structures. The conceptual layer represents some aspects of the actors’ understanding of the task in terms of models representing the structure of their knowledge and their knowledge of the process required to perform the task.

In a context of knowledge work, these layers correspond to doing (pragmatic) and thinking (conceptual) components of the activity as represented in Figure 1. From the point of view of knowledge management, we concentrate on the conceptual layer since the actors are knowledge workers who have the expertise to perform the task.

The model represents a generalisation of the task. We recognise two conceptual components associated with the task: a Structure and a Process. These two components come from the understanding of what concepts are involved in performing the task and how these concepts need to be applied. Task performance involves instantiating, and where necessary modifying, these generic components in a way that accommodates the current situation, and then executing the procedure. Reflection on and learning from task performance contributes to changes or improvements to the generic structure and process. In the context of knowledge work, specialising the structure and process, as well as reflecting on the instances of the task, is a fundamental feature of TbKM.

Each time a task is performed in a specific work context, the Structure and Process models are instantiated to reflect the specific work situation. Each instantiation then becomes a record of the task and cumulatively represents a task-based organizational memory (Ackerman & Mandel, 1995). The importance of this interpretation of the framework is that this memory is an essential part of the learning process. The historical evolution of these models is a
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