Chapter 91
Knowledge Synthesis Framework

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INTRODUCTION

The last decade of the 20th century saw explosive growth in discussions about knowledge—knowledge work, knowledge management, knowledge-based organizations, and the knowledge economy (Cortada & Woods, 2000). At the center of such discussions are the two notions of process and knowledge. The former represents not only the organization's operations characterized by clearly defined inputs, outputs, and flows, but also management practices which give the organization its depth and means for handling change and turbulence. The latter is represented by a range of complexity and intellectual richness, from Plato's "justified true belief" (Nonaka & Takeuchi, 1995) to a more mundane "the capacity to act" (Sveiby, 1997). How knowledge is characterized, used, and even created within an organization is a very complicated process. Nevertheless, we believe that each member of an organization has

his or her own knowledge space, which is subject to some level of description, and thus may be architected, integrated, and designed into an organization (Davenport & Prusak, 1998; Levine, 2001). As the source of wealth shifts from capital to knowledge (Drucker, 1992), it is clear that organizations that actively seek to create their own communal knowledge space from that, which exists among its members, will have a decided advantage over those who do not. One working definition of knowledge is hereby interpreted in terms of its potential for action and its ability to change context and goals—the rules of relevance and adaptation. Yet, what is the means by which a communal knowledge space may be built? And how would an organization use it for advantage? To answer these questions, this article is divided into five sections: The Background of Knowledge Synthesis; Pursuing the Ideal of a Learning Organization; Scaffolding the Knowledge Framework; Future Trends of IS Design for Knowledge Sharing; and Conclusion.

The first provides the foundations on understanding the knowledge phenomenon as it is

happening in many an organization today. The second serves as a digest in capturing some basic ideas of the learning organization. The third brings forth our conception of an actionable framework of knowledge synthesis, applicable to the Internet-based development of present-day organizations. The fourth discusses some of the challenges in information systems (IS) design for knowledge work. The fifth concludes the article by reiterating the challenges in doing organizational knowledge synthesis.

The theme of this article is to investigate strategies to enhance knowledge sharing through the idea of a learning organization. Its aim is to conceive appropriate design of IS support so as to expand an organization's capacity to adapt to future challenges.

THE BACKGROUND OF KNOWLEDGE SYNTHESIS

To situate our discussions about knowledge work in an organization, we first resort to the classification scheme of knowledge tasks from Charles Perrow (1970) on the basis of their analyzability (the degree to which search activity is needed to solve a problem) and variability (the number of exceptions—new or unexpected—encountered while performing a task). There are four task subtypes: craft, routine, engineering, and non-routine. *Routine* tasks are characterized by the combination of low variability and high analyzability. Namely, few exceptions are encountered in the work process, and when an exception does occur, little search behavior is required to handle it. *Craft* tasks are characterized by the combination of low variability and low analyzability. This means only a narrow range of exceptions being encountered, but a high level of search activity is needed to find a solution to problems. *Engineering* tasks are characterized by the combination of high variability and high analyzability. Namely, the number or variety of exceptions that workers

may encounter in the task is high, but finding a solution is relatively easy because well-understood standard procedures should have been established to handle the exceptions. Finally, *non-routine* tasks are characterized by the combination of high variability and low analyzability. It is the most complex and least routine of the four tasks in Perrow's classification. These tasks are complex because not only is the number of unexpected situations large, but search activity is high: Each new situation creates a need to expend resources to deal with it. A key goal of management is to analyze and refine what have been craft and non-routine tasks, and transform them into routine and engineering tasks. They constantly seek to reduce the ambiguity and uncertainty by routinizing work and the business rules governing that work. Nonetheless, organizational tasks are increasingly being craft and non-routine. Such knowledge work is not easily subject to process explicitness (clearly defined specifications). As tasks become more unanalyzable (i.e., craft, non-routine), the level of ambiguity increases and requires people with relatively more experience and tacit knowledge, and a certain level of rich information. Similarly, as tasks become more variable (i.e., engineering and non-routine), the level of uncertainty increases thereby requiring people with more training, formal education, explicit knowledge, and high quantities of information. Obviously, such is the backdrop behind which many an enterprise today has been developing their contexts for organizational knowledge synthesis.

In order to develop a communal knowledge space—one that develops new forms of knowledge from that which exists among its members—we must describe how and with what an organization performs its work, say, in terms of its core capabilities (i.e., strategic processes) and core competencies (i.e., knowledge areas applied to capabilities) (Stalk, Evans, & Shulman, 1992). Oftentimes the alignment context is expressed in terms of the dynamics of the people-process-system issue. Namely, we need to design suitable information

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