



Chapter XVIII

**Integrating Knowledge
Process and System Design
for Naval Battle Groups**

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INTRODUCTION

Interest in and attention to knowledge management have exploded recently. But integration of knowledge process design with information system design has long been missing from the corresponding literature and practice. The research described in this paper builds upon recent work focused on knowledge management and system design from three integrated perspectives: 1) reengineering process innovation, 2) expert systems knowledge acquisition and representation, and 3) information systems analysis and design. With this work, we now have an integrated framework for knowledge process and system design that covers the gamut of design considerations from the enterprise process in the large, through alternative classes of knowledge in the middle, and on to specific systems in the detail. We illustrate the use and utility of the approach through an extreme enterprise example addressing Navy carrier battle groups in operational theaters, which addresses many factors widely considered important in the knowledge management environment. Using this integrated methodology, the reader can see how to identify, select, compose and integrate the many component applications and technologies required for effective knowledge system and process design.

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KNOWLEDGE MANAGEMENT AND SYSTEM DESIGN

The power of knowledge has long been ascribed to successful individuals in the organization. But today it is recognized and pursued at the enterprise level through a practice known as knowledge management (Davenport & Prusak, 1998). According to recent surveys of the literature (Nissen, Kamel & Sengupta, 2000), interest in and attention to knowledge management (KM) have exploded recently, and many prominent technology firms now depend upon knowledge-work processes to compete through innovation more than production and service (McCartney, 1998).

Even a quick look through the trade press shows information technology (IT) lies at the center of most knowledge management projects today. But IT employed to enable knowledge work appears to target data and information, as opposed to knowledge itself (Ruggles, 1998). For instance, extant IT used to support knowledge management is limited primarily to conventional database management systems (DBMS), data warehouses and mining tools (DW/DM), intranets/extranets and groupware (O'Leary, 1998). Arguably, just looking at the word "data" in the names of many "knowledge management tools" (e.g., DBMS, DW/DM), we are not even working at the level of information, much less knowledge.

We feel this contributes to difficulties experienced with knowledge management to date. Knowledge is noted as being quite distinct from data and information (cf. Davenport, DeLong & Beers, 1998; Nonaka, 1994; Teece, 1998). And it is naïve to expect systems and tools developed to support data and information flows to prove useful for supporting the flow of knowledge through the enterprise. For purposes of this article, we draw from the literature and operationalize knowledge in terms of the actions it enables (e.g., making good decisions, effecting appropriate behaviors).

The research described in this paper builds upon recent work (Nissen et al., 2000; Oxendine & Nissen, 2001) focused on knowledge management and system design from three integrated perspectives: 1) reengineering process innovation, 2) expert systems knowledge acquisition and representation, and 3) information systems analysis and design. This recent work developed an integrated framework for knowledge process and system design. Such a framework covers the gamut of design considerations from the enterprise process in the large, through alternative classes of knowledge in the middle, and on to specific systems in the detail. In this paper, we demonstrate the application of this framework for integrated process and system design using a knowledge-intensive process example from the U.S. Navy: battle group theater transition. This method has been successfully applied to other maritime processes (Nissen & Espino, 2000), and its application in this paper builds on the fieldwork performed by Oxendine (2000).

In the sections that follow, we provide some background information drawn from the knowledge management literature. We then summarize the prior work to describe the framework for integrating knowledge process and system design. We subsequently employ this design approach through a specific Navy battle group example. This example addresses many factors widely considered important in the

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