Designing Portals for Knowledge Work

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INTRODUCTION

An increasing share of work in businesses and organizations depends on information and knowledge rather than manual labor and physical goods (Wolf, 2005). Knowledge work contributes substantially to the long-term success of an organization. It is characterized by unstructured, creative, and learning-oriented tasks and involves access to a wide variety of structured and unstructured data sources such as Web sites, databases, data warehouses, document bases, or messaging systems. Knowledge work is often hampered by the fragmentation of resources across these numerous elements of information and communication technology (ICT) infrastructures. Consequently, concepts for the design and implementation of integrating technologies are required in order to improve ICT support for knowledge work.

Originally, the term "portal" has been coined to denote the organized access to Internet resources by search engines and a categorized collections of links (Smith, 2004, p. 93). The metaphor has been extended to integrated access to data sources and applications or, in more recent terminology, contents, and services within businesses and organizations called enterprise (information) portal. Recently, emphasis seems to shift toward semantic integration of data and knowledge sources, services, persons, and processes referred to as knowledge portals (Collins, 2003; Firestone, 2003, p. 30ff; Hädrich & Priebe, 2005; Sandkuhl, 2005; Schwabe & Salim, 2002). This article reflects the ambitious goals and challenges of knowledge portals and proposes the concept of knowledge work situations for the design of knowledge portals.

BACKGROUND

Knowledge Portals

The term "enterprise portal" targets an organization-specific integration and is used to denote approaches and solutions, which vary widely. Substantial differences regarding scope, complexity, and ways of technical implementation can be observed depending on number and types of involved data sources and application systems, depth of integration, target groups, and further requirements (e.g., search, personalization, transaction or security, performance, availability, and scalability of the software solution. Portals are commonly classified according to user groups, contents, or functions (Hazra, 2002; Sandkuhl, 2005).

Examples are external access to business applications by customers or sales representatives (customer or employee portal), combination of multiple business applications for selected business processes (process portal), unified access to data and documents (information portal) or semantically integrated access to validated contents and documents, and contextualized collaboration and support of the entire knowledge life-cycle (knowledge portal, Firestone, 2003, p. 251ff).

Smith defines portals as infrastructures that provide secure, customizable, personalized, integrated access to dynamic contents in various formats from a multitude of sources wherever they are needed (Smith, 2004, p. 94). This shows a changed interpretation of the term portal toward a more far-reaching integration. It reveals ambitious goals, particularly related to the term knowledge portal, that can only be achieved by building a comprehensive infrastructure and implies substantially higher demands in terms of opening access to information systems, design of middleware and standardization of data formats, interfaces of functions, processes, and security procedures. It is no surprise that according to a market analysis, knowledge portals in this extended understanding do not yet exist (Firestone, 2003, p. 264ff). Knowledge portals strive for the vision of a comprehensive KM infrastructure that encompasses the entire systems landscape of an organization and thus is described in the following as enterprise-wide knowledge infrastructure.

Enterprise Knowledge Infrastructures

Enterprise knowledge infrastructures (EKI, Maier, Hädrich, & Peinl, 2005) offer their services as organization-wide platforms. They go beyond knowledge portals by postulating integration of services throughout the entire organization including every application relevant for KM and by offering a set of advanced services on top.

Numerous layered architectures have been proposed for the organization of this type of service (e.g., Applehans, Globe, & Laugero, 1999; Zack, 1999, p. 50). An amalgamated EKI architecture extending knowledge portals consists of the following five layers building on each other (Maier, 2004; Maier et al., 2005):

- **Infrastructure Services:** Offer basic functions for storage, access, communication, and security. Extract, transformation, and loading tools provide access to data and knowledge sources.
- **Integration Services:** Offer functions to organize and link knowledge elements. Integration is achieved by means of ontologies, standardized interfaces for functions, as well as integrated management of user data, called identity management.
- **Advanced Services:** Provide functions for *discovery* (i.e., search, retrieval, and presentation of knowledge elements and links to knowledge sources such as experts), *publication* (i.e., structuring, contextualization, and release of knowledge elements, *collaboration* (i.e., joint creation, sharing, and application of knowledge, and *learning* (i.e., authoring and management of courses, tutoring, learning paths, and examinations).
- **Personalization Services:** Provide more effective access to the large amounts of knowledge elements (e.g., by automated role-oriented or interest-oriented profiles, personal category nets, and customizable interfaces).
- **Access Services:** Transform contents and provide secure access to the EKI with respect to heterogeneous applications and appliances.

The layers in the architecture ideally organize services but abstract from current implementations as well as tools and systems offered on the market. Examples for software products are Open Text Livelink (www.opentext.com), Hyperwave Information Server (www.hyperwave.com), and Microsoft Sharepoint Portal Server (www.microsoft.com/sharepoint). Livelink offers sophisticated functions for integrated document and content management as well as collaboration, but lacks advanced support for learning, which is a strength of Hyperwave. The Sharepoint Portal Server offers rather basic functions for content management and collaboration. However, it might excel in its future integration with Microsoft Office products and the Groove Workspace.

DESIGN OF ENTERPRISE KNOWLEDGE INFRASTRUCTURES

Modeling Knowledge Work

Modeling supports analysis and understanding of knowledge work and guides the design of technical infrastructures and is required particularly for those infrastructures that attempt to integrate fragmented resources. Approaches useful for this latter integration task extend concepts for business process modeling in order to capture the specifics of knowledge work and are compared in Table 1 in order to identify relevant modeling concepts.

Concepts of description applied in these approaches can be categorized into the four classes *person* (e.g., identity, profile,

Table 1. Comparison of approaches for knowledge-oriented process modeling

	ARIS-KM (Allweyer, 1998)	**GPO-WM** (Heisig, 2002)	**KMDL** (Gronau & Weber, 2003)	**Promote** (Woitsch & Karagiannis, 2005)
***Primary* perspectives**	process, artifact, person	process, artifact, person, instrument (rudimentary)	process, person, artifact	process, artifact, tool, person
Primary goal of modeling	knowledge-oriented process design, build-time, and rudimentary run-time	introduction of best practice KM instruments, build-time	knowledge-oriented process design, build-time	selection and design of ICT services, run-time
Formalization	medium	medium	medium	high
Granularity	process	process	task	task
Primary level of modeling	type level	type level	instance level	type level
Starting points	not defined	incomplete knowledge core process	barriers	knowledge-intensive tasks
View on knowledge	object, skill	object, skill, flow	object, skill, conversion process	object, skill