

Knowledge Management Ontology

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INTRODUCTION

Many definitions of ontology are posited in the literature (see Guarino, 2004). Here, we adopt Gruber's (1995) view which defines ontologies as simplified and explicit specification of a phenomenon. In this article, we posit an ontology that explicates the components of knowledge management (KM) phenomena. This explicit characterization of knowledge management can help in systematically understanding or modeling KM phenomenon.

In the past decade, KM has received significant attention within the information systems community, however, the community has not provided a well-integrated framework to help unify this sub-discipline. Therefore, in an effort to provide a comprehensive and unified view of KM, we introduce a formal characterization of a KM ontology collaboratively developed with an international panel of KM practitioners and researchers. Prior articles have either detailed various portions of this ontology and described panelists' piecemeal evaluations of them (Holsapple & Joshi, 2000, 2001, 2002c) or outlined a more definitional and axiomatic version of this ontology (Holsapple & Joshi, 2004). Here, however, we provide a concise integrated view of the whole ontology.

Several methodologies for designing and developing ontologies have been proposed in the literature for many domains and for various objectives. For instance, Noy and McGuinness (2001) have posited seven steps for developing a basic ontology, whereas others, such as Guarino (retrieved 2004), have discussed the application of ontological principles in various context. Our ontology development process, although unique in certain aspects, incorporates many of the principles recommended in the literature.

BACKGROUND

The ontology was developed through a process of four phases including the preparatory, anchoring, collaborative, and application phases (Holsapple & Joshi, 2002a).

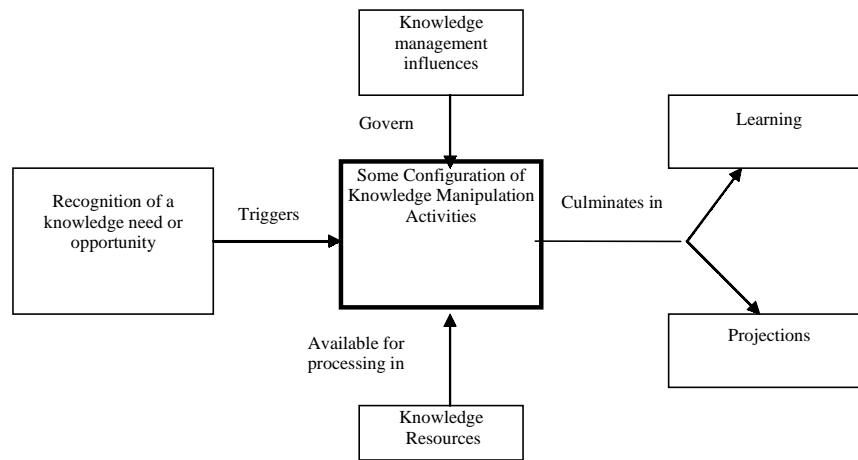
In the preparatory phase, standards and criteria for ontology development and evaluation were created. In the anchoring phase, an initial ontology by consolidating, synthesizing, organizing, and integrating concepts from the past literature was developed. During the third phase, a panel of 31 KM practitioners and researchers collaborated in two Delphi rounds to further refine, modify, and evaluate the initial ontology. The last phase involved illustrating the application and utility of the developed ontology.

KNOWLEDGE MANAGEMENT ONTOLOGY

This ontology defines knowledge management as an entity's (such as an individual, group, organization, community, nation) deliberate and organized efforts to expand, cultivate, and apply available knowledge in ways that add value to the entity, in the sense of positive results in accomplishing its objectives or fulfilling its purpose (Holsapple & Joshi, 2004).

Many definitions of knowledge can be found in the literature (see Nonaka, 1994; Alavi & Leidner, 2001; Marshall & Brady 2001; Randall, Hughes, O'Brien, Rouncefield, & Tolmie, 2001; Sutton, 2001). The objective of the Delphi process was to characterize knowledge management behaviors that can accommodate various perspectives on the nature of knowledge. Therefore, no single definition of knowledge was developed or adopted. Knowledge can be represented in mental, behavioral, symbolic, digital, visual, audio, and other sensory patterns that may occur in various object and process formats. Knowledge has a variety of attributes including mode (tacit vs. explicit), type (descriptive vs. procedural vs. reasoning), orientation (domain vs. relational vs. self), applicability (local vs. global), accessibility (public vs. private), immediacy (latent vs. currently actionable), perishability (shelf-life), and so forth. More complete and detailed listings of attribute dimensions for characterizing knowledge have been advanced but are beyond the scope of this article (Holsapple & Joshi, 2001; Holsapple, 2003a) In the interest of being

Figure 1. Architecture of a KM episode (adapted from Holsapple & Joshi, 2004)



generic, the ontology is neutral on these differential views.

This ontology adopts an episodic view to knowledge work. In other words, an entity’s knowledge management work is viewed as a collection of episodes. These episodes, which vary in structure, function, and purpose, unfold in various settings to accomplish a range of different tasks. This ontology characterizes a *knowledge management episode* (KME) (see Figure 1) as a configuration of *knowledge manipulation activities*, by a collection of *knowledge processors*, operating on available *knowledge resources*, subject to *knowledge management influences*, and yielding *learning* and/or *projections* (Holsapple & Joshi, 2004). Knowledge management episodes are triggered to satisfy a knowledge need or opportunity; it concludes when that need/opportunity is satisfied or terminated. Some examples of KME include decision-making, problem-solving, and brainstorming episodes.

KME is considered to have a learning outcome when the state of an entity’s knowledge resources is altered. On the other hand, projection outcomes are expressions or manifestations—in the form of knowledge, material, capital, or behavior—of an entity’s KME that are released into its environment. The resulting alteration in the state of the entity’s knowledge base or environment due to learning or projection can be functional or dysfunctional in nature. The three primary components that drive the execution of a KME are the *knowledge manipulation activities*, *knowledge resources*, and *knowledge management influences*.

Knowledge Manipulation Activities Component

Knowledge manipulation refers to the processing of usable knowledge representations embedded within an entity’s knowledge resources. Knowledge processors that possess skills for performing knowledge manipulations activities can be human participants or computer-based parts in an entity. Numerous classifications of knowledge manipulation activities have been forwarded by KM researchers (see Alavi & Leidner, 2001; Holsapple & Joshi, 2002c). However, they often fail to provide a unifying view due to the use of differing terminology and varying levels of manipulation activities. This ontology provides a relatively comprehensive, unifying, elemental characterization of the major knowledge manipulation activities that occur during knowledge work.

As illustrated in Table 1, the Delphi process uncovered elemental knowledge manipulation activities, their sub-activities, and their interrelationships. The five types of basic knowledge manipulation activities that can occur during knowledge work include *knowledge acquisition*, *knowledge selection*, *knowledge generation*, *knowledge assimilation*, and *knowledge emission*.

The knowledge resulting from the execution of a knowledge manipulation activity by a processor can be transferred for further processing to other instances of knowledge manipulation activities. In other words, knowledge flows into and out of knowledge manipula-

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