An Evaluation Model for Structural Memory using Ontologies / Weinberger Hadas

Abstract

This research proposes an upper-level ontology for the Organizational Memory (OM) domain, i.e., a schema (map) to guide SM design, construction, evolution and evaluation. The top level of the ontology is specified using the new generalized concept of Structural Memory (SM), which is a framework of types (e.g., Organizational Memory and Individual Memory) and components (content and mean) that enable Knowledge Management (KM). Its bi-dimensional construct enables the concrete representation of each memory type (e.g., enterprise, corporate, group or person) using its components dimension.

We have developed the SM ontology in the framework of an evaluation model. There are three stages in this evaluation model:

- 1. The development and evaluation of an ideal SM ontology.
- 2. The design and evaluation of existing SM ontologies.
- 3. A comparative evaluation of any existent SM vs. the ideal SM.

We believe the ontological approach is key to evaluating SMs. We demonstrate the feasibility of our approach by constructing the SM ontology using an Object-Oriented Paradigm (OOP) and UML (Unified Modeling Language). The SM ontology is comprised of about 90 entities and 100 processes described using UML use-case, class, activity and sequence diagrams. This development responds to the first part of the evaluation model – the development of the SM ontology as a generic tool to guide the development of existent SMs.

The resulting ontology is evaluated in the two dimensions of verification and validation, using a set of criteria for each. Verification was done in relation to the ontology internal features (e.g., clarity, coherence, extendibility and minimal ontological bias). Validation was carried out for conceptual coverage in relation to the world (i.e., the literature) that the domain ontology represents (e.g., completeness and granularity), as well as its usefulness (i.e., for case studies) in practice (e.g., competence and utility). Going through this exhaustive evaluation process provides us with proof of concept regarding the SM ontology internal features, conceptual

coverage and usefulness. The evaluation of the SM ontology also responds to the first stage of the evaluation model.

Empirical research was carried out in several organizations, in Israel and abroad. Four different existent SM models were defined and evaluated against the SM ontology for competence and utility. Doing this we have responded to the second and third stages of the evaluation model. In consequence, organizations can evaluate their current structural memory state (e.g., identify existing knowledge sharing gaps) and plan future development (e.g., interaction modes, knowledge products) to foster organizational learning.

In this undertaking we have responded to two goals defined for this research:

- 1. The development of domain ontology that responds to major KM related challenges, as defined in the literature.
- 2. The definition of an evaluation framework as a generic tool to guide SM development and evaluation.

In this undertaking we respond to major obstacles challenging researchers and practitioners aiming to overcome existing and potential barriers to successful evaluation and evolution of learning organizations. The SM ontology supports the iterative lifecycle of a contextualized, learning driven and evolutionary structural memories.

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