Chapter 6
Organizational Semiotics Complements Knowledge Management:
Two Steps to Knowledge Management Improvement

Jeffrey A. Schiffel
The Boeing Company, USA

ABSTRACT

Inserting the human element into an Information System leads to interpreting the Information System as an information field. Organizational semiotics provides a means to analyze this alternate interpretation. The semantic normal forms of organizational semiotics extract structures from natural language texts that may be stored electronically. In themselves, the SNFs are only canonic descriptions of the patterns of behavior observed in a culture. Conceptual graphs and dataflow graphs, their dynamic variety, provide means to reason over propositions in first order logics. Conceptual graphs, however, do not of themselves capture the ontological entities needed for such reasoning. The culture of an organization contains natural language entities that can be extracted for use in knowledge representation and reasoning. Together in a rigorous, two-step process, ontology charting from organizational semiotics and dataflow graphs from knowledge engineering provide a means to extract entities of interest from a subject domain such as the culture of organizations and then to represent these entities in formal logic reasoning. This chapter presents this process, and concludes with an example of how process improvement in an IT organization may be measured in this two-step process.

INTRODUCTION

How might an ontology be used to measure improvements in the management of organizational knowledge? And might that ontology be derived from natural language, and then translated into a formal reasoning system? The answers can be applied readily to any subject involving measurement of activities otherwise hard to quantify. The point of departure is the observation that organizational semiotics and knowledge management are opposite sides of the same coin.

Collaborating members of an organization share a culture. Effectively improving competitiveness is a goal of knowledge management. Improving organizational knowledge thus requires changing the organizational culture to leverage the collective knowledge of collaborating groups of workers. Knowledge management is intimately tied to corporate culture and values – and organizational semiotics models corporate culture through its processes and artifacts. The subject domain to be examined here is software process improvement in a large IT department.

Like knowledge management, those involved in process improvement must possess an appreciation of the organization's culture. The improvement framework to be demonstrated here is the Capability Maturity Model from the Software Engineering Institute. The preceding description suggests a two-step procedure of semantic norming and conceptual graph reasoning that take into account both the prevailing software engineering environment and an imposed improvement framework. Both steps require developing a different semantic net in each step. One is an ontology chart from organizational semiotics. The second is a conceptual graph from the knowledge representation branch of artificial intelligence. We may wish a well-defined and organized structure of entities that make up the domain of the problem at hand, but first we must be able to capture those relevant concepts before we can reason about the situation. The means involves systematic methods to extract and organize the concepts and relations, and then to transfer the resulting ontology construct into a formal, logical reasoning system. Two complementary methods are required. The first is drawn from organizational semiotics, permitting the extraction concepts and relations into an ontology chart, and then building a set of semantic normal forms. The second method then transfers the semantic normal forms into a knowledge representation realized in the dataflow graph version of conceptual graphs. The case study to be presented draws data from the CMM and software engineering procedures of an information technology group, an ontologically structured analysis of natural language artifacts found in organizational culture, translated to semantic normal form, and transformed into the dataflow form of a conceptual graph. Measurements of quality improvement steps take by the IT group over several years are then computed into comparative metrics by the dataflow.

Organizations may improve efficiency by improving the flow and use of that information. Efficiency arises from using and creating information to solve organization problems. This applies corporate knowledge to speed cycle time, reduce costs, or increase competitiveness. (Public services increase abilities to deliver services, rather than increase competitiveness.) Since computers store and process information and make it available to organizational users, data and information must be put into some logical form to be computable. Underlying logical forms for computation rely on some form of first order logic, along with other syntax, predicates, and quantifiers. These computer data constructs have meaning only in the self-contained world of the computer system. They do not provide meaning in the real world of the organization. Communication is not explained by encodings, transmissions and decodings in computer systems, but as mental constructs (Pietarinen, 2010). That is this role of organization members, who provide the human element to produce and interpret the facts in the computer and turn those

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