

Chapter 1

How Culture May Influence Ontology Co-Design: A Qualitative Study

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ABSTRACT

This article addresses the issue of cultural influence in ontology design and reuse. The main assumption is that an ontology is not only a socio-technical artefact but also a cultural artefact. It contains embedded assumptions, core values, points of view, beliefs, thought patterns, etc. Based on results already found in several design fields the authors formulate some preliminary hypotheses about the possible relationships existing between culture and features of design process and produced ontology. A critical and qualitative analysis of six collaborative design systems has been performed to test some of the hypotheses, confirming some of the findings. The authors argue that a “culture aware” attitude may be of great importance for supporting the processes of cross cultural collaborative ontology design and the internalization and localization of these kinds of artefacts.

INTRODUCTION

Ontology engineering has been traditionally viewed as a purely technical activity. As a consequence the social, communicative and rhetorical aspects that are at the base of collaborative ontology design and reuse are usually filtered out or not adequately tackled (Toppano et al., 2008). The main assumption we make is that an ontol-

ogy is not only a socio-technical artefact but also a cultural artefact (Toppano, 2010). It embodies assumptions, deep values, points of view, beliefs, etc. of the community that developed it. The (re) use of an ontology - either when it is used as a metamodel for an entire application (or for a part of it) or when it is used to annotate and support reasoning about specific web resources - informs the perception, interpretation, and action in the

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world. Ontology designers, instead of simply making an “object,” are actually creating a persuasive argument that is embodied within the artefact and that comes to life whenever a user uses the ontology as a means to some end (Buchanan, 1985). In this study we intend to explore how culture may influence collaborative ontology design. Recently several research efforts have been devoted to study the role of culture in design. These efforts mainly concentrate in the field of interface design (Marcus & Gould, 2000; Ford & Kotzé, 2005), (Kersten et al., 2002), and web design (Wurtz, 2005; Callahan, 2005; Pfeil et al., 2006). This interest is strictly related to the internalization and localization processes of these products. Despite the importance of cultural factors, at present we do not know studies that have tackled this problem in the field of ontology engineering. We argue instead that a “culture-aware” approach may be of great importance for the development of systems (e.g., web services) that more or less implicitly adopt ontologies and for supporting the processes of intercultural collaborative design. This study is a preliminary investigation. We have reviewed relevant literature on cross-cultural design and tried to distil some findings that could be useful in our application domain. We are aware of the fact that such findings might be specific to the inquiry context in which they were discovered (i.e., that people may exhibit different cultural characteristics when assessed in different contexts). However, we think that such an effort can be used as a starting point for future more focused and rigorous work. The paper is organized as follows. We start with a brief discussion of the concept of culture, dimensions of cultural variation and the role culture has on thought. Next we summarize some perspectives about technology that we deem relevant to understand the different orientations of researchers about the nature of ontology and its development. Thirdly, some hypotheses about how culture may influence the concept of ontology adopted by researchers, the structure of the ontology conceptualisation and the

design process are formulated. Finally, a critical analysis of six systems is presented in order to test some of the hypotheses, followed by conclusions and future work.

THEORETICAL BACKGROUND

What is Culture?

According to Hofstede (1991, 2003) culture is a “collective programming of the mind which distinguishes the members of one group from another” and consists of “common characteristics”, that influence a groups’ response to its environment. Schein (1999) asserts that culture is a “set of basic assumptions - shared solutions to universal problems of external adaptation (how to survive) and internal integration (how to stay together) - which have evolved over time and are handed down from one generation to the next.” Other scholars (Hall, 1990; Geertz, 1973) adopted a communication related definition of culture and focus on shared meanings. They suggest that culture consists of patterned ways of thinking that are shared across people in a society; they are based on a set of taken-for-granted assumptions and core values that influence individuals’ mental models, cognition, attitudes, behaviours and are embodied in physical and symbolic artefacts. Thus, understanding the assumptions grounding a culture is needed to distinguish among cultures and discover coherence and meanings within them. In distributed collaborative ontology development we distinguish among different types of cultures: 1) national or regional ones; 2) ethnic cultures spanning national geographic boundaries such as Arab or Latin Americans cultures; 3) corporate cultures based on shared practices, 4) professional cultures such as those emerging when a cross functional team develops an ontology. In many cases, discriminating the cultures is not a clear-cut task, which complicates the job of ontology design usually belonging to several cultures simultane-

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