For many years in the area of business systems analysis and design, practitioners and researchers alike have been searching for some comprehensive basis on which to evaluate, compare, and engineer techniques that are promoted for use in the modelling of systems’ requirements. To date, while many frameworks, factors, and facets have been forthcoming, none appear to be based on a sound theory. In light of this dilemma, over the last 10 years, attention has been devoted by researchers to the use of ontology to provide some theoretical basis for the advancement of the business systems modelling discipline. This paper outlines how we have used a particular ontology for this purpose over the last five years. In particular, we have learned that the understandability and the applicability of the selected ontology must be clear for IS professionals, the results of any ontological evaluation must be tempered by economic efficiency considerations of the stakeholders involved, and ontologies may have to be focused for the business purpose and type of user involved in the modelling situation.

Keywords: Bunge-Wand-Weber model, ontology, modelling techniques

INTRODUCTION

Ontologies and ontological engineering have received much attention in the systems analysis and design literature over the last decade. One of the main reasons for this situation is the lack of sound theoretical guidance available to Information Systems (IS) professionals when evaluating, using, and, even constructing requirements analysis and systems modelling techniques. Ontology is an area of philosophy dedicated to articulating the nature and structure of the real world. Given that IS professionals create computer systems that depict a portion of the real world, ontology is one obvious candidate to provide the conceptual underpinning that has been
missing for so long from the IS modelling discipline.

Our work in the area of ontological analysis and engineering over the last five years has developed in four principal directions. These directions have been formed in response to consistent issues raised empirically on our original work by respected academics and practitioners. First, we began by selecting an ontology—Bunge’s (1977) ontology—as it had been comprehensively applied to the IS modelling area by Wand and Weber (1989, 1995)—the BWW models. We applied this analytical theory to structured analysis techniques as they were implemented in CASE tools (Green, 1997) and, most recently, to process modelling techniques and tools used primarily in the context of SAP R/3 (Green & Rosemann, 2000). It was apparent from this work that there were difficulties for readers in understanding the ontological constructs and determining how to compare/apply these constructs to those contained in the modelling techniques under analysis. Accordingly, our second principal direction of work has been to develop a meta model of the BWW constructs in a more popular IS language. This meta model can be compared against existing meta models for target modelling techniques, e.g., UML and Event-driven Process Chains (Scheer, 2000). By using a pattern-matching technique, the constructs of the BWW model can be applied/compared to those of the target modelling technique in an objective manner. Third, our empirical work in ontological analysis has clearly identified that ontological clarity and completeness of representation of real-world constructs in modelling are not the only factors driving the technique/tool decisions of modelling users. Indeed, the type of user and their business purpose—the user’s perspective—will also influence markedly these decisions. Accordingly, our work in this direction is to produce focused ontologies dependent on the type of user and business purpose. Finally, on the basis of the work in these three directions, we can provide theoretical and empirical developments for ontological engineering related to requirements analysis and modelling techniques. It is interesting to note that our work to date fits concisely into the following future information systems modelling research opportunities as defined by Wand and Weber (2002), viz., ontological evaluation of grammars, empirical testing of theoretical predictions and rules, and individual and task contextual factors influencing the modelling activity.

This paper unfolds in the following manner. The first section explains the problems we have encountered in using ontology to analyze and evaluate modelling techniques. In particular, it explains our approach to mitigating these problems. The next section summarises our experiences and contributions in the area of using ontology to analyze and evaluate individual modelling techniques. On the basis of these analyses, we have explained the weaknesses in techniques and we have achieved reasonable success in confirming these predictions with users. The third section explains how we have recognised that the type of user and the business purpose of their modelling activity, in addition to ontological clarity and completeness of representation, influence ontological engineering. Next, this paper describes how our previous work forms a basis for engineering developments in modelling techniques. Finally, we indicate the directions in which our work is continuing and developing.
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