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Thirty Years Later:
Some Reflections on Ontological Analysis in Conceptual Modeling

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ABSTRACT

The idea that ontological theories could be used to provide a theoretical basis for evaluating conceptual-modeling grammars and scripts was initiated some thirty years ago. The authors provide some brief history about the early research that discussed how ontological theories might be used to study conceptual-modeling grammars and scripts. They then give an overview of the progress that has been made using various elements of this early research. Next, they outline some of the major critiques that have been made of conceptual-modeling work that uses ontological foundations. Finally, the authors suggest some areas that they believe hold substantial promise in using ontology to better understand and predict conceptual-modeling phenomena.

KEYWORDS

Conceptual Modeling, Conceptual-Modeling Grammar, Conceptual-Modeling Script, Good-Decomposition Model, Ontology, Representation Model, State-Tracking Model

INTRODUCTION

We are delighted to see the publication of this Special Issue of the *Journal of Database Management* on the topic of ontological analysis in conceptual modeling. Moreover, we are honored that in part the motivation for the Special Issue arises from work we undertook in the late 1980s about how ontological theories might underpin the study of conceptual-modeling grammars and scripts. We thank the Editor-in-Chief and the Editors of the Special Issue for initiating it and their hard work in bringing it to fruition. Also, we thank all the authors who submitted papers to the Special Issue. We congratulate those whose papers ultimately were accepted and encourage those whose papers were rejected (an experience we know only too well!) to persevere with their work.

In the information systems discipline, scholars who work on the topic of conceptual modeling and ontology are relatively few in number. We suspect the reasons are several. First, many information systems scholars have been trained primarily in organizational science areas, and thus they see management-related issues as more interesting than technology-related issues (which rightly or wrongly are generally thought to include conceptual modeling). Second, for many information systems scholars, the topic of conceptual modeling lacks the appeal of research on emerging technologies (because it is deemed to be an old-technology problem). Third, historically, papers on the topic of conceptual modeling have been difficult to publish in the major information systems journals (although this situation is changing). Thus, young scholars, in particular, have shied away from the

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topic. As one outcome of this Special Issue, therefore, we hope more scholars might be enticed to work or remain working on the topic.

Since our initial work on conceptual modeling and ontology, we have been encouraged and inspired by the small group of researchers who continue to work assiduously on the topic (many have published in this journal). In our conversations with many of them, they clearly see conceptual modeling as lying at the core of the information systems discipline. They have not been deterred by a commonly held view that they are working on the margins of the discipline (and perhaps on an outdated problem). Instead, they are optimistic that in due course the merits of their work will be recognized more widely. We share their optimism.

Indeed, currently we see an irony. On the one hand, representation theory, which encompasses the topic of conceptual modeling and ontology, has been named as one of the few theories that might be considered as native to the information systems discipline (Gregor, 2006; Straub, 2012). On the other hand, as we indicated above, historically, representation theory, conceptual modeling, and ontology have attracted little attention. Perhaps in due course the tension educed by this irony will be mitigated.

Importantly, we see signs of a sea-change. More papers on representation theory, conceptual modeling, and ontology are appearing in major information systems journals (e.g., Bera, Burton-Jones, & Wand, 2011; Bowen, O'Farrell, & Rohde, 2009; Burton-Jones & Grange, 2013; A. Burton-Jones & P. N. Meso, 2006; Lukyanenko, Parsons, & Wiersma, 2014; Parsons, 2011; Parsons & Wand, 2008; Recker, Rosemann, Green, & Indulska, 2011; Shanks, Tansley, Nuredini, Tobin, & Weber, 2008; Sia & Soh, 2007; Strong & Volkoff, 2010). In our view, the research on these topics is also becoming increasingly creative and innovative (in ways we never imagined!), and it is being applied to more types of information systems phenomena. For scholars who work on representation theory, conceptual modeling, and ontology, therefore, there are good reasons to be optimistic, to be excited, and to persevere.

The Editors have kindly asked us to write an introduction for the Special Issue. After discussions with them, we determined we should write some reflections on history, progress, critiques, current trends, and possible futures for the topic of ontology and conceptual modeling. Perhaps with the exception of early history, we stress we have no special insights about progress, current trends, and possible futures, and our comments about critiques will reflect our own views about the merits of these critiques. Nonetheless, we hope at least some of our reflections might be helpful for and resonate with colleagues as well as motivating and encouraging them to begin or to continue work on this topic.

Our reflections proceed as follows. First, we provide some brief history about our initial work in which we proposed a link between ontology and conceptual modeling. We hope this history does not appear to be self-indulgent or self-centered because our intent is to help younger colleagues see that serendipity and adversity sometimes play an important part in the formation of new ideas that eventually gain at least some traction within a discipline. Second, we give our perspectives on the state of progress on the topic of ontology and conceptual modeling. Third, we outline some of the major critiques made of the topic and provide a brief response to them. Fourth, we reflect on current trends. Fifth, we indicate some areas where we believe promising futures lie. Finally, we give some brief conclusions.

SOME HISTORY

In December 1985, one of us (Weber) left the University of Queensland to go on sabbatical leave to the University of British Columbia. Shortly thereafter, he attended the International Conference on Information Systems in Ann Arbor, Michigan. On the return flight from Chicago to Vancouver via United Airlines, he sat next to the other of us (Wand). Together we shared our concerns about the state of theory in the information systems discipline. One of us was concerned that the discipline constantly borrowed theories from other disciplines rather than developing its own core theories (Weber, 1987). The other was seeking theories that might be used to bring order to the disparate,