Editorial Preface

Special Issue on Ontological Analysis in Conceptual Modeling, Part 2

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This publication is the second part of the special issue on Ontological Analysis in Conceptual Modeling. This second issue consists of three papers. As with the papers in the first issue, all papers in this special issue were thoroughly reviewed and revised before acceptance. We had an overwhelming response to the CFP and, unfortunately, some papers could not be accepted.

The first paper in this issue "Evaluation of the Ontological Completeness and Clarity of Object-Oriented Conceptual Modelling Grammars" is written Tilakaratna and Rajapakse (2017). The paper evaluates the suitability of OO modelling grammars for conceptual modelling. The research focuses on one widely used OO modelling grammar, the Unified Modelling Language (UML). The first phase of this research study focused on evaluating all UML constructs and identifying a subset of UML constructs that are capable of representing real-world phenomena in user domains. The second phase was an empirical evaluation of the identified subset of UML constructs. The results of this empirical evaluation suggest that instead of using all UML constructs, the subset of UML constructs is better suited for conceptual modelling.

The second paper is titled "Effects of Domain Familiarity on Conceptual Modeling Performance" by Suh and Park (2017). In this research, the authors first researched the interaction effect among syntax, semantics, and pragmatics to discover the preferred design, context, and user knowledge with which models are more likely to be understood or interpreted. The second part of the research is an experiment to reconcile conflicting outcomes and acquire a more complete and accurate understanding of construct overload. Specifically, the authors focused on understanding the end users' modeling performance between ontologically clear and unclear models. They applied an improved experimental methodology that integrates three features (i.e., syntax, semantic, pragmatic) rather than treat them individually and employs different degrees of domain familiarity in the conceptual model (i.e., familiar domain vs. unfamiliar domain).

The last paper in this part of the special issue "Combined use of conceptual models in practice: An exploratory study" is written by Jabbari Sabegh and Recker (2017). In this research, the authors explore the reported use of multiple conceptual models for system analysis and design to determine the circumstances that lead professionals to use multiple models. They uncover both semantic and pragmatic reasons that influence the choice and selection of different models for system analysis and design tasks. Contrasting these findings to existing ontological theories, the authors find that the extent and type of multiple model use is determined by not only ontological factors but also contextual factors that can override ontological qualities and in so doing bring forth desired qualities for users.

Including the four papers in the first special issue, these seven papers provide an excellent snapshot of the state-of-research on ontological analysis in conceptual modeling based on Wand and Weber's adaptation and extension of Bunge's ontology. The four papers in the first special issue are:

1. Thirty Years Later: Some Reflections on Ontological Analysis in Conceptual Modeling by Wand and Weber (2017);
2. Conceptual Modeling Meets Domain Ontology Development: A Reconciliation by Storey (2017);
3. A Framework for Managing Complexity in Information Systems by Kaul, Storey, and Woo (2017);
4. Improving the Domain Independence of Data Provenance Ontologies: A Demonstration Using Conceptual Graphs and the W7 Model by Liu and Ram (2017).

As discussed in Burton-Jones et al. (2017), the field of information systems requires native theories. The field of information systems has utilized, adopted, and adapted theories from fields such as psychology, sociology, organizational behavior, and management to provide the theoretical underpinning and conceptual foundation for our research. As the information systems field starts to mature, the field requires native theories that we can call our own. Wand and Weber's ontological theory (drawing on the ontology of Mario Bunge) provides a theory that can be applied to study information systems analysis and design, an area that some argue is unique to the information systems field. Wand and Weber introduced the ontological theory in three seminal papers (1990, 1993, 1995). These three papers established three views on information systems as representations of human perceptions of a domain of interest: the representation model, the state-tracking model, and the good decomposition model.

As can be seen from the seven papers in these two special issues, the idea of using ontological theory to explore and comprehend the information systems field has taken root in the community and the ontological theory has been applied to many different studies such as evaluation of modeling methods and grammars (e.g., Siau, 2010; Siau and Rossi, 2011; Chan et al. 2014). The ontological model also provides a conceptual foundation to suggest guidelines and best-practices around how grammars for conceptual modeling and database design might be modified to be ontologically sound. Although the ontological theory is not a silver bullet or a magic wand that can help to produce perfect information systems models, having a theory to guide the information systems analysis and design process is better than the pre-theory era when modeling was done based on intuition or experience alone.

The two special issues serve two main purposes. First, it has been more than 25 years since the early work in this area. It is time to take stock and review the contribution ontological analysis has made to the information systems field over the past quarter century. Second, these two special issues celebrate the retirements of Ron Weber and Yair Wand. They have contributed much to information systems research, particularly with the introduction of ontological theory to the field. Their collaborative efforts have also provided a good case study of how long-term research programs can be developed, adapted, and improved over time.

Finally, we would like the thank Yair Wand and Ron Weber, and the authors of the other six papers for contributing to the two special issues. We hope that these two special issues provide new ideas to extend and expand the ontological theory, and spur new research on the important topic of conceptual modeling, and systems analysis and design.

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REFERENCES

Burton-Jones, A., Green, P., Parsons, J., & Siau, K. (2017). Preface to Ontological Analysis in Conceptual Modeling -- Part I. *Journal of Database Management*, *28*(1), vii–x.

Chan, H. C., Tan, C. H., & Teo, H. H. (2014). Data Modeling: An Ontological Perspective of Pointers. *Journal of Database Management*, *25*(4), 17–37. doi:10.4018/JDM.2014100102

Jabbari Sabegh, M. A. J., & Recker, J. (in press). Combined Use of Conceptual Models in Practice: An Exploratory Study. *Journal of Database Management*, *28*(2).

Kaul, M., Storey, V., & Woo, C. (2017). A Framework for Managing Complexity in Information Systems. *Journal of Database Management*, *28*(1), 31–42. doi:10.4018/JDM.2017010103

Liu, J., & Ram, S. (2017). Improving the Domain Independence of Data Provenance Ontologies: A Demonstration Using Conceptual Graphs and the W7 Model. *Journal of Database Management*, *28*(1), 43–62. doi:10.4018/JDM.2017010104

Siau, K. (2010). An analysis of Unified Modeling Language (UML) graphical constructs based on BWW ontology. *Journal of Database Management*, *21*(1), i–viii.

Siau, K., & Rossi, M. (2011). Evaluation Techniques for Systems Analysis and Design Modelling Methods: A Review and Comparative Analysis. *Information Systems Journal*, *21*(3), 249–268. doi:10.1111/j.1365-2575.2007.00255.x

Storey, V. (2017). Conceptual Modeling Meets Domain Ontology Development: A Reconciliation. *Journal of Database Management*, *28*(1), 18–30. doi:10.4018/JDM.2017010102

Straub, D. (2012). Does MIS Have Native Theory? *Management Information Systems Quarterly*, *36*(2), iii–xii.

Suh, J., & Park, J. (in press). Effects of Domain Familiarity on Conceptual Modeling Performance. *Journal of Database Management*, *28*(2).

Tilakaratna, P., & Rajapakse, J. (in press). Evaluation of the Ontological Completeness and Clarity of Object-Oriented Conceptual Modelling Grammars. *Journal of Database Management*, *28*(2).

Wand, Y., & Weber, R. (1990). An Ontological Model of an Information System. *IEEE Transactions on Software Engineering*, *16*(11), 1282–1292. doi:10.1109/32.60316

Wand, Y., & Weber, R. (1993). On the Ontological Expressiveness of Information Systems Analysis and Design Grammars. *Journal of Information Systems*, *3*(4), 217–237. doi:10.1111/j.1365-2575.1993.tb00127.x

Wand, Y., & Weber, R. (1995). On the Deep Structure of Information Systems. *Information Systems Journal*, *5*(3), 203–223. doi:10.1111/j.1365-2575.1995.tb00108.x

Wand, Y., & Weber, R. (2017). Thirty Years Later: Some Reflections on Ontological Analysis in Conceptual Modeling. *Journal of Database Management*, *28*(1), 1–17. doi:10.4018/JDM.2017010101

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Jeffrey Parsons is University Research Professor and Professor of Information Systems in the Faculty of Business Administration at Memorial University of Newfoundland. His research interests include conceptual modeling, ontology, crowdsourcing, information quality, and recommender systems. His research has been published in leading journals in information systems, computer science, management, and science. Jeff is a Senior Editor for MIS Quarterly, a former Senior Editor for the Journal of the Association for Information System, and a member of the editorial board of the Journal of Database Management. In addition, he has served as Program Co-chair for a number of conferences, including the ER conference - the leading conference on conceptual modeling.

Keng Siau is Chair of the Department of Business and Information Technology (BIT) at the Missouri University of Science and Technology. Professor Siau received his PhD in Business Administration from the University of British Columbia in 1996. Prior to joining Missouri University of Science and Technology in June 2012, he was Edwin J. Faulkner Chair Professor and Full Professor of Management at the University of Nebraska-Lincoln (UNL). Professor Siau served as the Vice President of Education for the Association for Information Systems and served as the AIS representative on the Board of Partnership for Advancing Computing Education (PACE) from July 2011-June 2014. Professor Siau has more than 250 academic publications. According to Google Scholar, he has more than 9300 citation counts and his h-index and i10-index are 48 and 118 respectively. His current research interests are Economic and Social Impact of Artificial Intelligence, Business Analytics and Data Science, Design Science, and Human Computer Interaction and User Experience.