Principled Pragmatism: A Guide to the Adaptation of Ideas from Philosophical Disciplines to Conceptual Modeling

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Abstract. The synergism among the traditional disciplines of ontology, epistemology, logic, and linguistics and their potential for enhancing conceptual-modeling applications is not fully understood. Better understanding how to adapt ideas from these disciplines should lead to improved serviceability of conceptual modeling. We argue in this position paper, however, that application objectives, rather than philosophical tenets, should guide the adaptation of ideas from these disciplines. Thus, an appropriate balance of discipline-based theory and pragmatism should temper adaptations. We evaluate the principled pragmatism we advocate by presenting several case-study examples. Each illustrates that an appropriate adaptation of ideas from the disciplines of ontology, epistemology, logic, and linguistics can significantly guide conceptual-modeling research and help build successful conceptual-modeling applications.

1 Introduction

The applicability of ontology, epistemology, logic, and linguistics to conceptual modeling seems compelling. But what role should these disciplines play in facilitating conceptual-modeling applications? To what extent should conceptual-modeling researchers adopt or adapt philosophical ideas, positions, adages, and objectives from these disciplines? Must they be purists in their adaptation, or is it appropriate to leverage fundamental ideas and objectives and let the pragmatism of the application dictate the adoption and adaptation of theoretical tenets of the various perspectives within and surrounding these disciplines?

We argue in this position paper that application-dependent pragmatism should guide the adaptation of ideas from these disciplines to the various research directions within the conceptual-modeling community. In adapting ideas from these disciplines to conceptual modeling, we espouse the adage attributed to Einstein that everything should be made “as simple as possible, but no simpler.”

To establish our position, we first sketch our contextual view of ontology, epistemology, logic, linguistics, and conceptual modeling (Section 2.1). We then argue that being solution-oriented requires appropriate selective adaptation of
ideas from these areas (Section 2.2). Appropriate selectivity requires tempering by two crucial, overarching considerations: the adaptation must be principled, and it must be pragmatic. From our perspective forcing purist views for adaptation may overly complicate the conceptual-modeling application in opposition to Einstein’s sufficiency-with-simplicity adage. To make our views concrete, we present several case-study examples to show how the principle of practical pragmatism has served and can further serve as a guide to adapting ideas to conceptual modeling (Section 3). Then, as we conclude (Section 4), we generalize and assert that the principled pragmatism we advocate is potentially more far-reaching in its implications than to just the case-study examples we use for illustration. It provides a vision and perspective for adapting philosophical disciplines to conceptual-modeling applications. Further, it answers in part the question about the relationship among “Ontology as an Artifact, Ontology as a Philosophical Discipline, Conceptual Modeling, and Metamodelling.”

2 Philosophical Disciplines and Conceptual Modeling

2.1 Contextual Overview

Ontology, as a field of philosophy, investigates problems of existence: what exists, how do we know what exists, how does an object’s existence relate to universal reality, and related questions. Deciding what reality is, and which relations characterize reality, are at the core of ontological investigation. A central theme of ontology is ontological commitment, which is about having enough evidence to commit to an object’s existence.

Epistemology studies knowledge and belief. It explores where knowledge comes from, how it is represented (including its structure), what its limits are, and how it can be used to refute assertions or support belief and discover truths. Important topics include how to quantify, describe, create, disseminate, and operationalize knowledge. For example, how much knowledge is necessary (or sufficient) for accomplishing a given task? How do we acquire and codify knowledge? What constitutes good evidence for justification of a belief?

Logic is about valid reasoning. It allows us to explore generalization, abstraction, and inferred relationships among objects that exist. Logic can be formalized in several different ways: proof theory, model theory, formal languages, linguistic expressions, mental representations, or graphical visualizations. Principles of correct reasoning guarantee the validity of inferences and set up systems of meaning that can be manipulated at higher levels of abstraction.

Linguistics investigates languages, either formal (e.g. logic or mathematics) or natural (i.e. human languages). Since language is crucial to communicating ideas, knowledge, beliefs, and logic, all of the above areas are of concern to linguists. So, too, are the structure, properties, contextual realities, and meaning of sounds, words, sentences, discourse, and dialog.

Conceptual modeling deals with computational representation of concepts and how to communicate these representations. Concept representation, from