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978-0-521-06335-7 - Information Systems Development and Data Modeling: Conceptual
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Rudy Hirschheim, Heinz K. Klein and Kalle Lyytinen

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Preface

Though the fields of information system development, in general, and data modeling in particular — the topics of this book — have amassed an impressive amount of research knowledge during the past two decades, they currently lack a global perspective and interpretation. In this context we define information systems development as the application of information technologies (computers and telecommunications) to solve and address problems in managing and coordinating modern organizations. Data modeling is concerned with describing, organizing and analyzing the properties of the ‘rawware’ of information systems — data. A wealth of research in these fields has produced an astonishing array of empirical results and practical insights, conceptual and terminological diversity and confusion, and a large suite of tools and methods. But as many researchers and practioners alike feel, these form an isolated, disjoint, and often contradictory amalgam of knowledge. In such a situation, the synthesis of the existing knowledge is at least as valuable as the addition of more detail in the form of further empirical results, new methods and tools, and refinements in vocabulary, etc. The need for synthesis to decrease the confusion in the area has motivated us to write this book: we seek out the principal, contradictory lines of research in information systems; describe and interpret them and their results in a way which does not deny or hide their differences, but in fact highlights the differences; and thereby hope to make these lines of research understandable. At the same time we strive to shed light on similarities where they exist and to discuss possible directions for improvement.

To accomplish our task, we need an intellectual tool to penetrate beneath the ‘surface structure’ of individual pieces of IS research and to organize them in some intelligible manner. We believe we have found such a tool in the form of a philosophical framework for analyzing the assumptions which guide different lines of research on IS and which points out the ways in which each line of research is somehow limited but at the same time brings order into chaos by making visible which assumptions make the approaches so different and what the implications for adhering to alternative assumptions are. We point out that all systems development methodologies make implicit assumptions which we feel may be problematic. Let us take a concrete example. Most (but not necessarily all) modeling techniques focus on functions, data or objects as elementary building blocks. The implicit and/or explicit underlying assumptions are that:

- (1) these building blocks exist in the world (realism) and

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- (2) there is an objectively definable set of things whose definition is independent of the perceptions of the developer (objectivism).

The implication of the first assumption is that it is the developer's job to 'find' those objects as though they were the treasures of a sunken ship washed up on shore just waiting to be picked up by the first one to come along. The implication of the second assumption is that any two developers should come up with the same model (because they will find the same treasures) and if there are differences they are resolvable. If two developers do see things differently, assumption (2) suggests that one developer is not seeing the application as clearly as the other, or that one developer is simply not as good as the other.

As our analysis reveals alternative standpoints are possible as well. What if the objects are not given, but are to be constructed out of the pieces on the shore with the flotsam and jetsam of many cultures (the different user languages and views)? What if there are no universals, e.g. what are shells to one culture is money to another? Thinking along such lines, in this book we shall show:

- (1) that most studies on information systems development rely on a specific standpoint which we call here a functionalist world view,
- (2) that this view amounts to a distinct philosophical position, and
- (3) this position is problematic in understanding and engaging in many facets of systems development.

If this point is accepted, then it is logical to ask what alternative philosophical positions are possible and what their implications for systems development and data modeling could be.

It will turn out that at least four philosophical positions can be discerned in the literature and these can account for many of the contradictory results and insights in the field. Researchers or practitioners adhering to different philosophical positions simply see different objects on the beaches (or should we say in the trenches) while developing information systems. This observation sets the principal agenda for this book: to define the fundamental philosophical positions, and to explain how they apply to systems development in general and data modeling in particular. The refinement of these issues form the core of our argument in this book. This will be a long and involved argument, like a long and winding road with many paths, but we have found it rewarding though difficult at times to navigate. We hope that many readers will enjoy the same experience, and that they will never see the same beach again after closing this book.

Rudy Hirschheim, Heinz Klein, Kalle Lyytinen
Houston, Owego and Hong Kong

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This book has been both a physical and metaphorical journey for us. It has been an intellectual journey as well. Physically, it started out over 7 years ago in London and then Oxford, but has wound its way through places such as San Francisco, Owego, Jyväskylä, Lovanger, Houston, Ehringerfeld, Aalborg, Boston, Copenhagen, New York, Buffalo, Enschede, Orlando and Hong Kong. Over the years we have had many deep philosophical discussions, some of which have led to considerable disagreement, others which have resulted in the three of us uttering in unison ‘ah ha’. No matter what the outcome, these philosophical discussions were always intellectually inspiring.

We learned a lot in writing this book. But it wasn’t easy. Not much attention has been given in the literature to the kind of philosophical analysis of an applied field such as Information Systems. We felt like a voice in the wilderness when we first started with this book. Metaphorically, we had to find a path through the wilderness which would lead us to fertile grounds to satisfy our intellectual hunger. In this way, we came to know many interesting places which are not commonly visited by IS researchers. In our search for intellectual sustenance, we were delighted to find a few kindred spirits (or travel companions so to speak) who also tried to articulate the most fundamental assumptions on which the discipline of IS in general or ISD in particular rests. Among these kindred spirits we include Boland’s (1979): ‘Control, Causality and Information System Requirements,’ Winograd and Flores’ (1986) ‘Understanding Computers and Cognition’, Iivari’s (1991) ‘Paradigmatic Analysis of ISD’, Dahlbom and Mathiassen’s (1993) ‘Computers in Context’, and Ehn’s (1988) ‘Work-Oriented Design of Computer Artifacts’.

Behind every significant journey is a large cast of supporting characters helping with the journeys’ organization and execution. These individuals give advice, warn of dangers, point to fruitful avenues and offer the weary travellers physical and emotional sustenance. We owe a great deal of thanks to many people who supported us in our endeavor; who sacrificed much while we spent many days sequestered away writing the manuscript. First, we would like to thank our respective families; their support and understanding during the seven years is gratefully appreciated. Next, Cambridge University Press and especially David Tranah must be thanked for their extreme patience and unwavering support. It would have been so easy for them to say: ‘look guys, enough is enough’. But they didn’t, and we sin-

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