

Preface

This book addresses the development of quantitative tools intended to improve the understanding of design activities. The motivation of the research was to understand human design processes and test new approaches to analyse design protocols.

Two foundational concepts are presented: (1) an ontologically based coding scheme and (2) linkography that utilises that coding scheme. The Function-Behaviour-Structure (FBS) ontology is used as a foundation to understand designing and to examine design protocols—protocols are segmented and coded according to FBS design issues. This provides a coding method that is independent of the design domain, the number of designers, whether the designers are collocated or not, and whether or not they use tools. Linkographs are composed of the semantic connections between segments. Since each segment is already coded with an FBS design issue, a link defines the transformation of one FBS design issue to another—in other words—a design process. Such a linkograph generates all the design processes in a design protocol. The coded protocol and its linkograph provide the base datasets for a range of analysis techniques including standard statistics, Markov modelling and clustering. Entropy, as it is used in information theory, is used to measure linkographs and test for correlations between entropy and design outcomes.

These quantitative tools were developed and tested on data from a pilot study and from various design experiments. The design protocols presented in this book are for demonstration purposes and the results from them are indicative of the kinds of results possible rather than generalizable conclusions. The concepts and techniques described in this book to examine design activities are aimed at increasing the tools and techniques available to readers to increase their understanding of this activity called designing.

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