# Chapter 12
# Models for Interpretive Information Systems Research, Part 2:
## Design Research, Development Research, Design-Science Research, and Design-Based Research – A Meta-Study and Examples

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## ABSTRACT

*This chapter introduces interpretive research as a background to research that is time-and context-dependent. The study presents practical, yet theoretical research approaches that are relevant to postgraduate studies and to ad-hoc research. The models proposed as interpretive research designs are development research, design-science research, and design-based research. Systems development, in and of itself, is not research, but when integrated with evaluation and applied both to solve real-world problems and to propose general design principles, it gives rise to development research. Design research – termed design-science research in the domain of information systems (where it has roots in software engineering) and design-based research in educational technology (where the approaches are more pragmatic) – has clearly defined features and methods in each domain respectively. The common attributes are the generation of creative and innovative artifacts to serve in complex situations, and the joint advancement of theory and practice. The three research designs are described, and each is illustrated by an example of a study where the model was applied.*

## INTRODUCTION AND BACKGROUND

Interpretive research, which originated in the behavioural social sciences, is increasingly applied in Information Systems (IS). In line with the current emphasis within IS on the social dimensions of computing, researchers and practitioners are taking cognizance of human factors and behavioural aspects. This chapter forms Part 2 of a discourse on models for interpretive information systems research. It follows on Part 1, which is a separate chapter in the book, Chapter I.7a. This meta-research study is not aimed at major systems for business, but more at small-scale systems for personal computing, in particular user-centered educational software systems. It suggests various underlying theoretical models to guide the research and development process, providing cohesion and internal consistency.

For overviews of the positivist and interpretive research paradigms, qualitative and quantitative research methods, and relevant terminology, the reader is referred to Part 1 (Chapter I.7a). Part 1 discusses interpretive IS research, then describes and graphically illustrates two interpretive approaches: *action research* and *grounded theory*, explaining their operation as research designs and giving examples of situations where they were applied as the underlying research model. This chapter, Part 2, has a similar approach and structure, and presents three models from the family of design- and development research – *development research*, *design-science research* (so-called in IS), and *design-based research* (in the educational technology context). In three respective sections, descriptions are given of their features and processes, and examples are provided of studies where these research designs were applied.

We briefly re-visit some key concepts from Part 1. Research paradigms are based on varying philosophical foundations and conceptions of reality (Cohen, Manion & Morrison, 2005; du Poy & Gitlin, 1998; Olivier 2004). Each paradigm, in turn, is implemented by associated methodological strategies.

The positivist paradigm holds that knowledge is absolute and objective, and that a single objective reality exists. Positivism is implemented by the scientific method, in which knowledge is discovered by controlled means, such as experiments and other quantitative methods based on numeric data and measurements. Results should be value-free, consistent, unbiased, and replicable.

Interpretivism, by contrast, aims to find new interpretations or underlying meanings and permits the accommodation of multiple correct approaches and findings, mediated by time, context and researcher. Inquiry is value-related, influenced by context and by researchers' subjective interpretations. Interpretivism is associated mainly with qualitative studies that address research questions relating to phenomena in naturalistic, human-based social settings. Data is mainly verbal and research is often triangulated by multiple methods of data collection.

Hybrid approaches, combining interpretivism and positivism, are also used. Mixed-methods research capitalizes on applying both qualitative and quantitative methods, which are not mutually exclusive, although one is usually predominant, e.g., QUAL + quant (Creswell, 2009). Many studies require eclectic inquiry to cover the terrain and to apply methodological triangulation and data triangulation. Qualitative research can be exploratory, with its findings used to formulate hypotheses for subsequent quantitative analysis and verification. Conversely, the findings of quantitative studies can be tested and extended by using qualitative research, e.g., interviews, to enrich the data.

Research designs and paradigms used in Information Systems, are under the spotlight (Baskerville, 1999; Cockton, 2002; De Villiers, 2005; Glass, Ramesh & Vessey, 2004; Myers, 2004; Pather & Remenyi, 2004). Interpretive and evaluative approaches have become accepted (Klein & Myers, 1999; Roode, 2003; Walsham,

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