FRANKFURT UNIVERSITY OF APPLIED SCIENCES

(3-6) Scientific Work

Research Methods

Prof. Dr. Swen Schneider
Leadership/Strategic Information Management
WS 2023/24

Pswd: ResMeth23

Fachbereich 3
Wirtschaft und Recht | Business and Law

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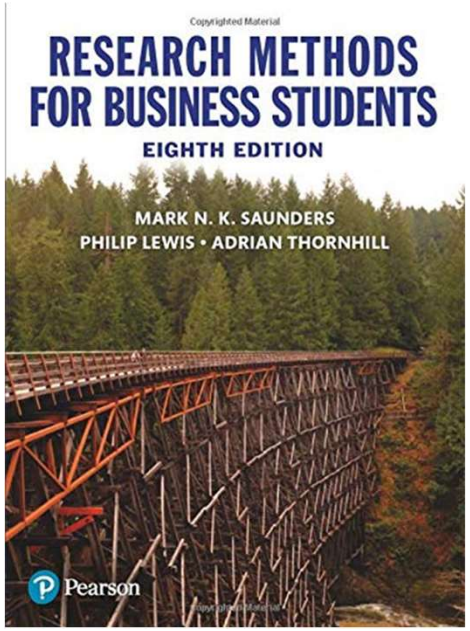
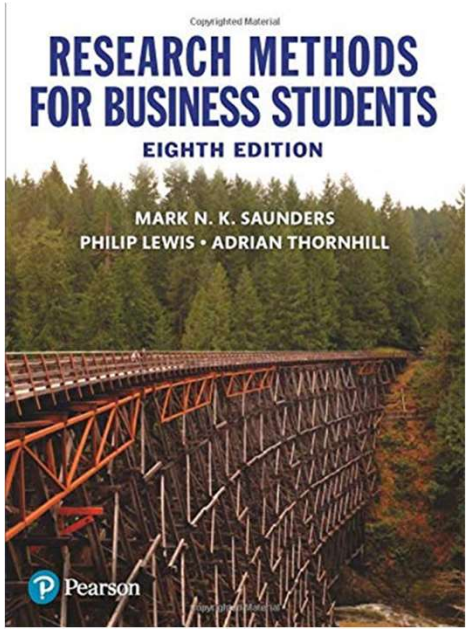
Agenda



1	Business and management research, reflective diaries and the purpose of this book
2	Choosing a research topic and developing your research proposal
3	Critically reviewing the literature
4	Understanding research philosophy and approaches to theory development
5	Formulating the research design
6	Negotiating access and research ethics
7	Selecting samples
8	Utilising secondary data
9	Collecting data through observation
10	Collecting primary data using research interviews and research diaries
11	Collecting primary data using questionnaires
12	Analysing data quantitatively
13	Analysing data qualitatively
14	Writing and presenting your project report

Agenda

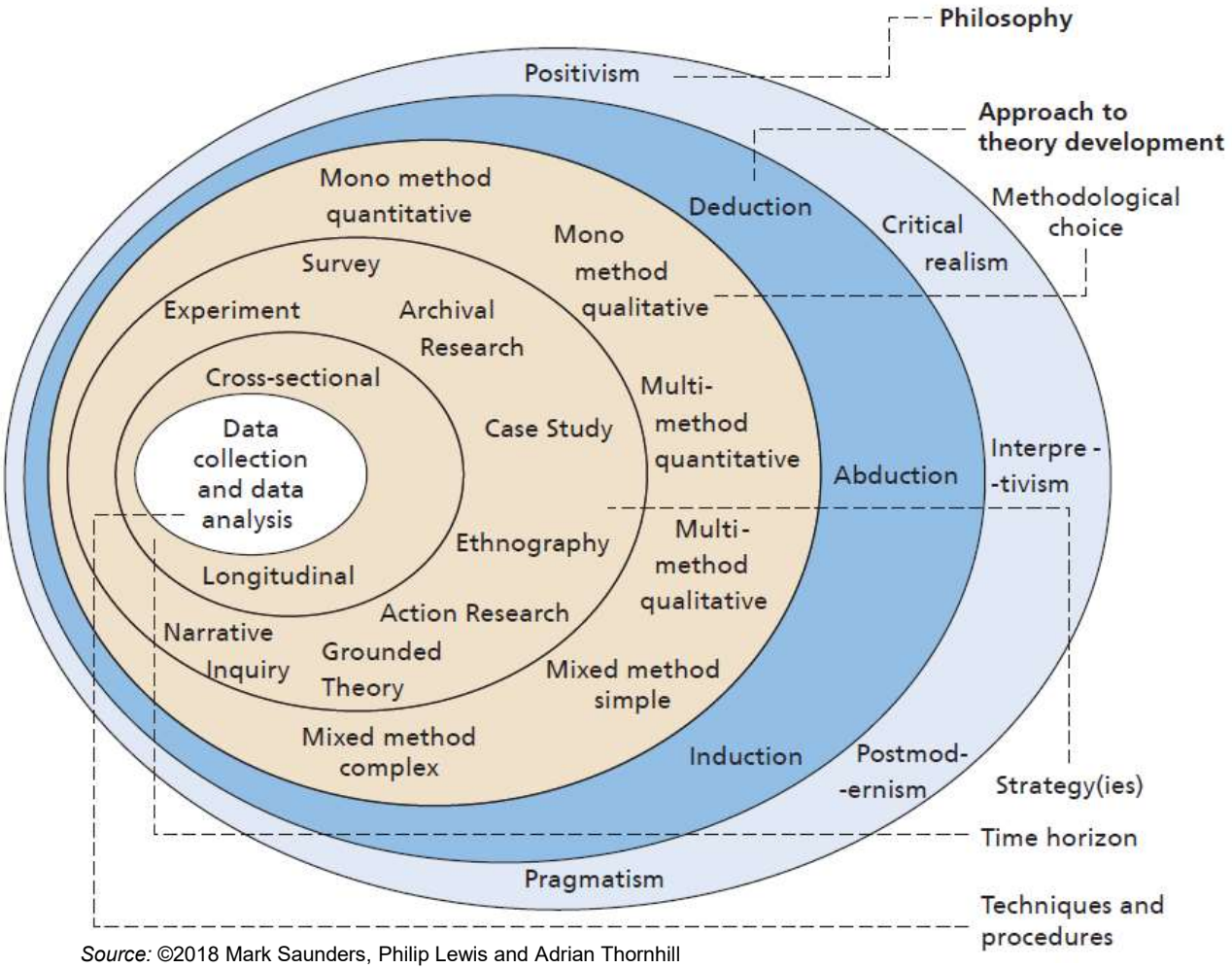


Objectives:

1. What is Science and what are the Objectives
2. What is Critical Rationalism
3. Inductive vs. Deductive Type of Research
4. Difference of Quantitative vs Qualitative Methods

The Research Onion gives you an overview

Figure 4.1
The 'research onion'



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How does science create knowledge

Science is the activity of acquiring knowledge through research, its passed on through teaching, and the social, historical and institutional framework, in which this is organized, as well as all human knowledge was acquired.

http://de.wikipedia.org (10/2007)

Science has the goal of creating knowledge and to find explanations for what is happening in the world. It reflects the historic, social or otherwise collective related system of human knowledge as it was elicited, collected and stored by special criteria.

. Empirical Research

Empirical research is the systematic search for knowledge through systematic evaluation of experiences

Research is the methodical and systematic search for new knowledge and the systematic documentation and publication in the form of scientific articles. Research contributes to the expansion of human knowledge and relies on the old or tried, previous systems, rules, and theories to refute to gain a new understanding of the phenomena in our environment.

Empirical research defines a profile, cross-sectional study or cross-sectional design as a one-time conducted empirical research (e.g. questionnaire, content analysis). This creates a snapshot of a societies' current facts, opinions and behaviors. When conducting a cross-sectional design, a large sample size is used to ensure its accuracy.

-> Scientific Peer-Review Procedere

http://www.qualitative-research.net/index.php/fqs/article/view/969/2115

Types of Research

While deduction moves from general in to specialized, induction tries to extrapolate a specific scenario to a general one.

Descriptive research provides the most complete description of a clearly defined area of study with an equally well-defined population and sample

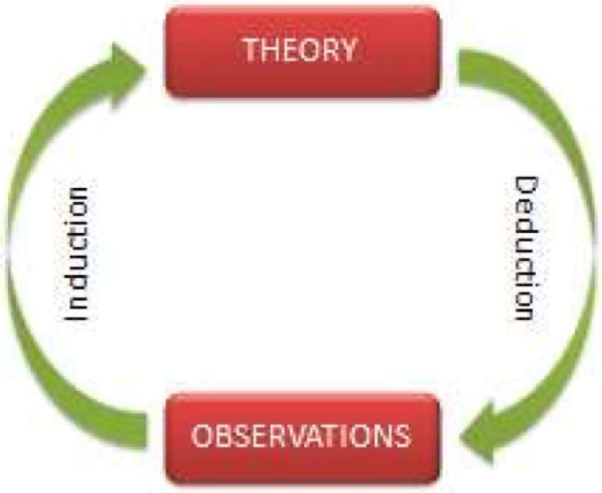
Exploratory research examines subjects which have up until now been not at all or only barely studied with the goal of getting a first glimpse

Explanatory research seeks to explain observed phenomena, problems, or behaviors

Induction

Data Collection

Generalize from observations



Deduction

Logically Thinking

Test hypotheses

Bhattacherjee, Anol, "Social Science Research: Principles, Methods, and Practices" (2012)

What is a Theory?

- A theory is a system of logically non-contradictory statements about a object of study;
- Originally the investigation of the truth
- A theory has the characteristics of a defined law

Theories are through thinking achieved knowledge, as opposed to knowledge acquired through experience

Theories have the function of describing issues, giving explanations and making predictions. Therefore it is a network of good established hypotheses respectively recognized empirical regularities.

What is a Methodology ?

Methodology is the study of the scientific methods

Methods are the regulated and comprehensive use of instruments for measuring social or scientific data. Such methods must meet certain scientific criteria.

The methods of business science describe procedures in order to gain knowledge about the about the economic and social world

Methods are targeted, planned procedures, whose purposes are to describe the most efficient way between the initial position and the objectives

Quantitative Empirical Social Research is based on numerical values and statistical methods

Qualitative Empirical Social Research captures the "reality" with largely verbal means

The method does not determine the problem but rather the problem determines the method

Methods have to meet the scientific criteria

- **Reliability**, i.e., measurement accuracy, reproduction of results
- **Validity** through the presence of exact logical-methodological criteria (measures what you like to measure)
- **Objectivity** through intersubjective testable theories

- **Critique Open** results with the striving for new knowledge
- **Consistent Inner Logic** with no faulty logical derivations, but justified, reasonable and non-contradictory statements
- **Outer Logical Non-Contradictory**, i.e., no conflict with other well proven theories
- **Explanatory** value and relevance

Contrast: pseudoscience (uncritical and self-contained)

Why we need a model

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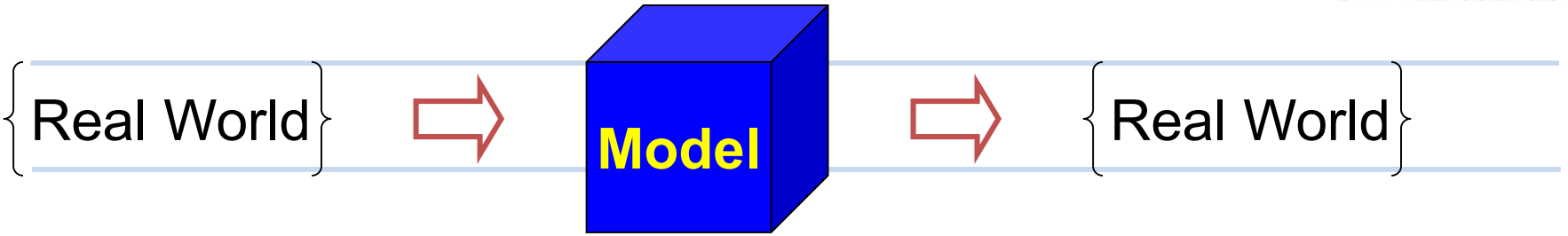
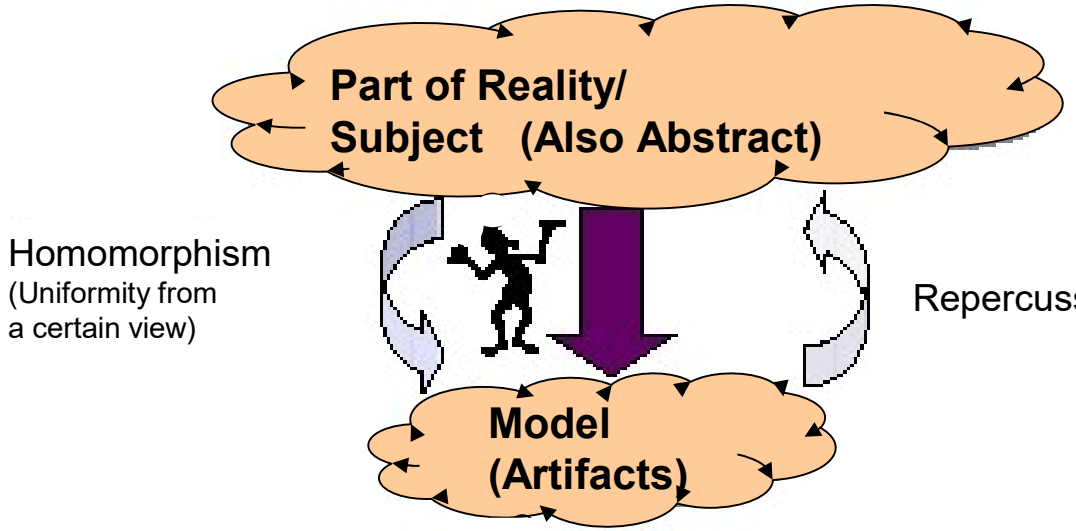


- Simplified image of a part of reality
- Used to reduce complexity
- Subjective process of the image
- Imaging is partly limited by the choice of the modeling method
- Goal and purpose dependent representation

Modeling



depends on:
- purpose
- modeling method / modeling construction

Development of Critical Rationalism

Sir Karl Raimund Popper (* 28. July 1902 in Wien; † 17. September 1994 in London) was an Austrian-British philosopher, who with his work in epistemology, scientific theory and political philosophy, established **Critical Rationalism**.

Main work: “Logic of Research” 1934

www.wiwkipedia.de (11/2007)

Thesis: Universally valid propositions can never be derived from singular experiences. Therefore, theories can not be verified, but rather falsified.

-> Critical Rationalism from K. Popper

Falsifications Principal:

Progress of knowledge only by eliminating false, respectively bad established principals

Sir Karl Raimund Popper (1902-1974): Philosopher and science theorist

Critical Rationalism

Insight into the theory of science
Karl Popper:

- Rejection of **induction** as a method of proof
- The **verification** of a theory is not possible:
  infinite number of individual observations required

Example: "All materials expand when heated"

- But **falsification** done thorough a single observation

The only valid procedure: **deduction**

Premises	All human beings are mortal	A -- > B
	Socrates is a human being	A
Conclusion	Conclusion Socrates is mortal	B

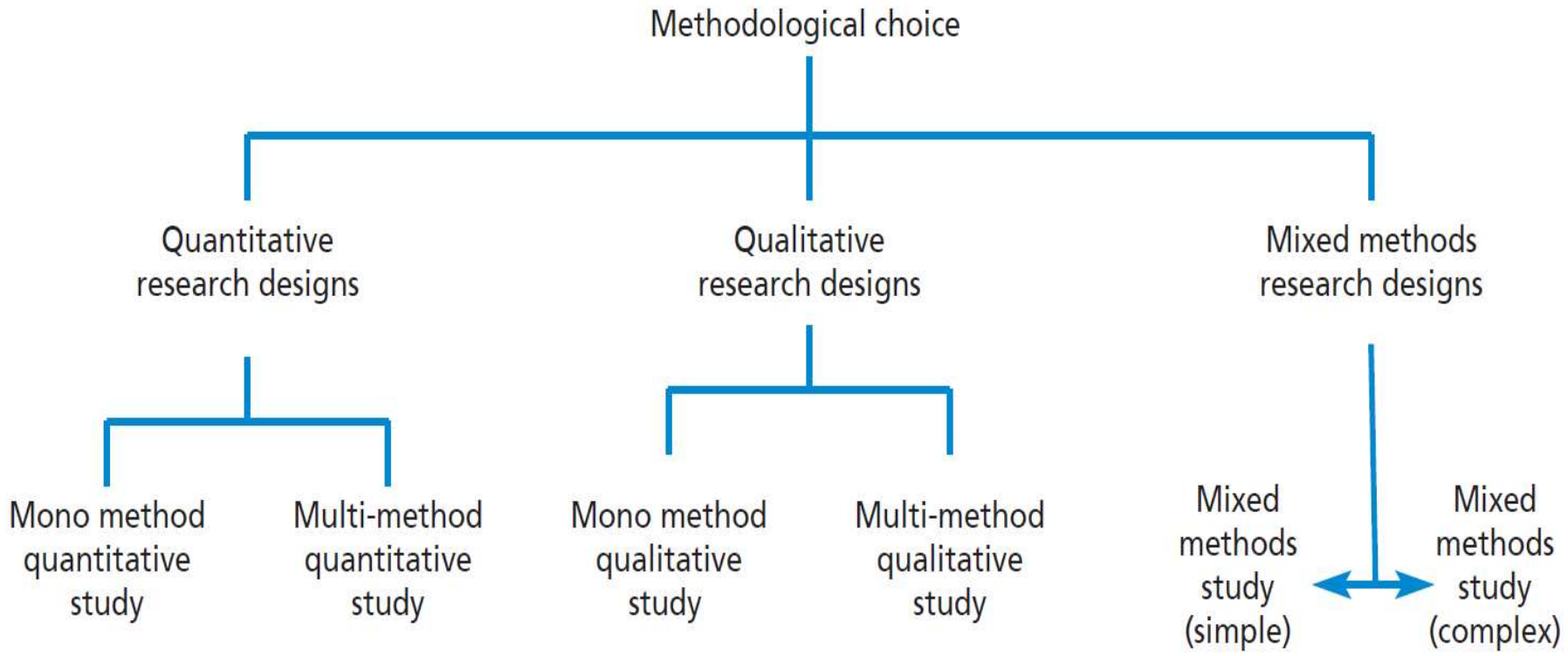
Inference rule of **modus ponens**: "When 'B follows A' and 'A is true', then 'B is also true.'"
(Wikipedia/Modus Ponens)

http://www.science-at-home.de/misc/wissenschaft/wissenschaftliche_methode_02.php (11/2007)

The research design is a strategy for integrating different components of the study in a coherent and logical way

Research Design

Figure 5.2 Methodological choice



The research design is a strategy for integrating different components of the study in a coherent and logical way

5.4 research designs

Philosophical assumptions

Quantitative research designs are generally associated with positivism, especially when used with predetermined and highly structured data collection techniques.

Positivism is a philosophical system that holds that the only valid knowledge is based on observation and experience

The research design is a strategy for integrating different components of the study in a coherent and logical way

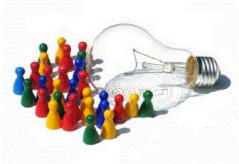
5.4 Quantitative research designs

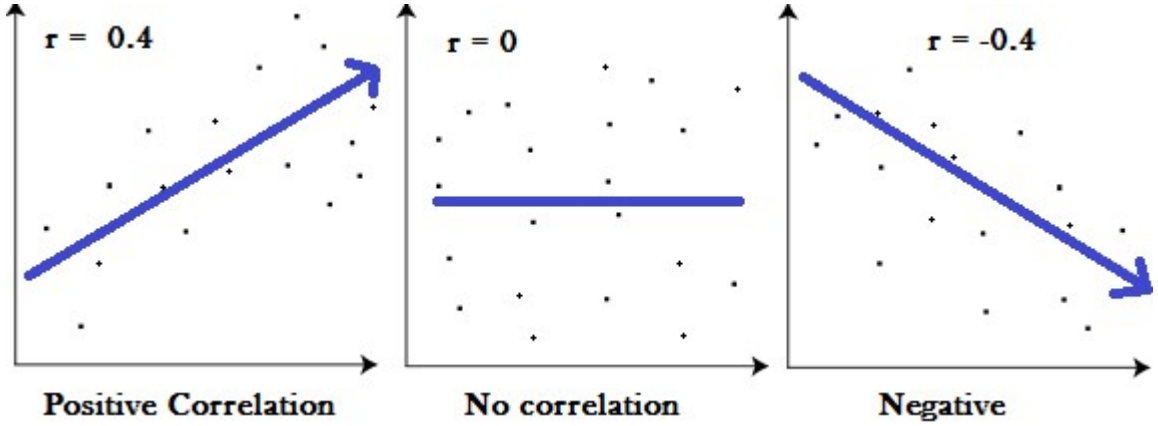
Characteristics

Quantitative research examines relationships between variables, which are measured numerically and analysed using a range of statistical and graphical techniques.

It often incorporates controls to ensure the validity of data, as in an experimental design. Because data are collected in a standardised manner, it is important to ensure that questions are expressed clearly so they are understood in the same way by each participant. This methodology generally uses probability sampling techniques to ensure generalisability

Example: Correlation Analysis





The research design is a strategy for integrating different components of the study in a coherent and logical way

5.4 Quantitative research designs

Research strategies

Quantitative research is principally associated with experimental and survey research strategies. In quantitative research, a survey strategy is normally conducted through the use of questionnaires or structured interviews or, possibly, structured observation.

The research design is a strategy for integrating different components of the study in a coherent and logical way

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A quantitative research design may use a single data collection technique, such as a questionnaire, and corresponding quantitative analytical procedure. This is known as a mono method quantitative. A quantitative research design may also use more than one quantitative data collection technique and corresponding analytical procedure. This is known as a multi-method quantitative study. You might, for example, decide to collect quantitative data using both questionnaires and structured observation, analysing these data statistically. Multi-method is the branch of multiple methods research that uses more than one quantitative or qualitative method but does not mix themf

The research design is a strategy for integrating different components of the study in a coherent and logical way

5.4 Quantitative research designs

The Correlation Coefficient Formula in Statistics

https://www.youtube.com/watch?v=WpZi02ulCvQ

1:28

The research design is a strategy for integrating different components of the study in a coherent and logical way

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5.4 Quantitative research designs

- Researcher is generally seen as independent from those being researched.
- Those taking part are usually referred to as respondents.
- Designed to examine relationships between variables.
- Often uses probability sampling techniques to ensure generalisability.

- Method(s) used to collect data are rigorously defined and highly structured.
- Collection results in numerical and standardised data.
- Analysis conducted through the use of statistics and diagrams.
- Resulting meanings derived from numbers.


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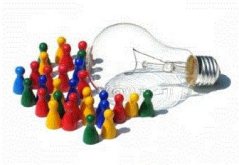
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5.4 Qualitative research designs

Philosophical assumptions
Qualitative research is often associated with an interpretive philosophy.

Such research is sometimes referred to as (syn) naturalistic research (Verhaltensforschung).

It is interpretive because researchers need to make sense of the subjective and socially constructed meanings expressed about the phenomenon being studied.

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5.4 Qualitative research designs

Approach to theory development
Many varieties of qualitative research commence with an (a) inductive approach to theory development, where a (syn.) naturalistic research design is used to build theory or to develop a richer theoretical perspective than already exists in the literature.

However, some qualitative research strategies start with a (b)deductive approach, to test an existing theory using qualitative procedures


QUANTITATIVE


QUALITATIVE

5.4 Qualitative research designs

Characteristics

In qualitative research, meanings are derived from words and images, not numbers.

A qualitative research design may use a single data collection technique, such as semi-structured interviews, and corresponding qualitative analytical procedure. This is known as a mono method qualitative. A qualitative research design may also use more than one qualitative data collection technique and corresponding analytical procedure. This is known as a multi-method qualitative study.

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5.4 Qualitative research designs

Research strategies

Qualitative research is associated with a variety of strategies. Some of the principal strategies used with qualitative research are: Action Research, Case Study research, Ethnography, Grounded Theory and Narrative Inquiry.

5.4 Qualitative research designs

Techniques

Techniques:
- Observation (includes Internet-mediated observation)
- Videography
- Semi-structured and in-depth interviews
- Group interviews (Section 10.8),
- Telephone interviews (Section 10.9) and
- Internet-mediated interviews

Case Study = Fallstudie

Ethnography = Völkerkunde

...

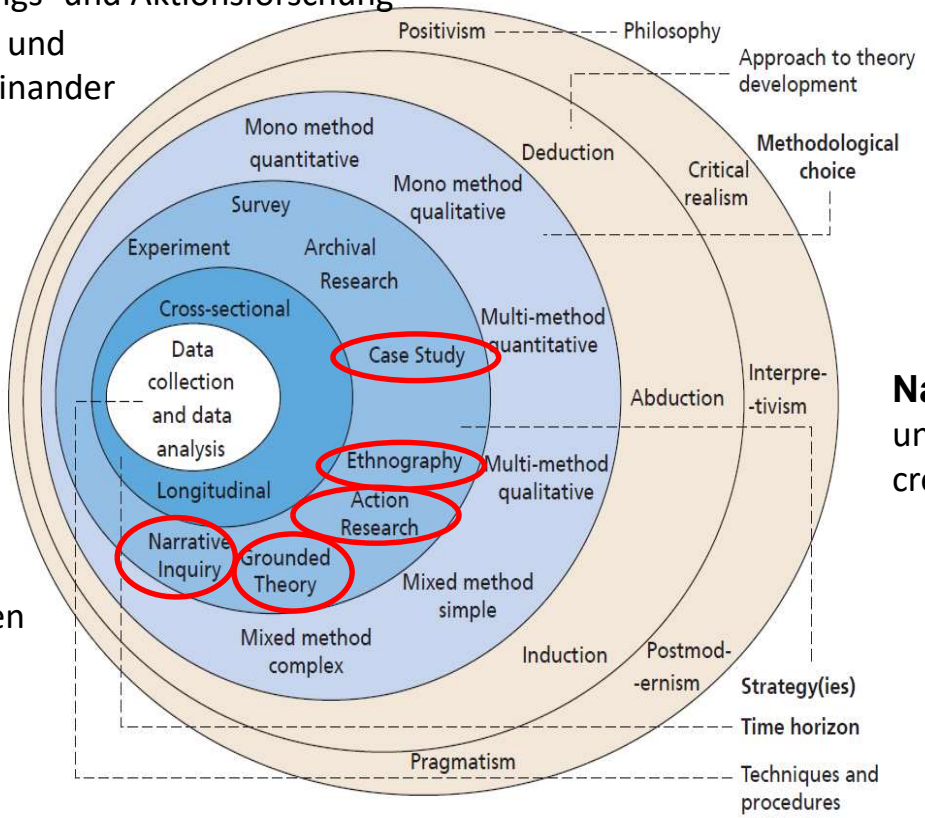
5.4 Qualitative research designs

Action research = Handlungs- und Aktionsforschung

- (theoretisches) Studium und (praktische) Aktion miteinander verbinden
- (theoretical) study and (practical) action Connected with each other

Grounded theory =

- Auswertung von Interviewtranskripten, Beobachtungsprotokollen
- Evaluation of interview transcripts, fieldnotes



Source: © 2018 Mark Saunders, Philip Lewis and Adrian Thornhill

Narrative Inquiry = understand the way people create meaning in their lives

Table 5.2
Characteristics of qualitative research

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5.4 Qualitative research designs

- Researcher is generally recognised as not being independent from those researched.
- Those taking part are referred to as participants or informants.
- Designed to study participants' attributed meanings and associated relationships.
- Generally uses non-probability sampling techniques.
- Based on meanings expressed through words (spoken and textual) and images.

- Method(s) used to collect data are unstructured or semi-structured.
- Collection results in non-standardised data generally requiring classification into categories.
- Analysis conducted through the use of conceptualisation.
- Resulting meaning derived from words (spoken or text) and images.

5.6 Mixed methods research designs

Philosophical assumptions

Mixed methods research is the branch of multiple methods research that integrates the use of quantitative and qualitative data collection techniques and analytical procedures in the same research project.

Pragmatists use relevant data to be collected to address the research problem.

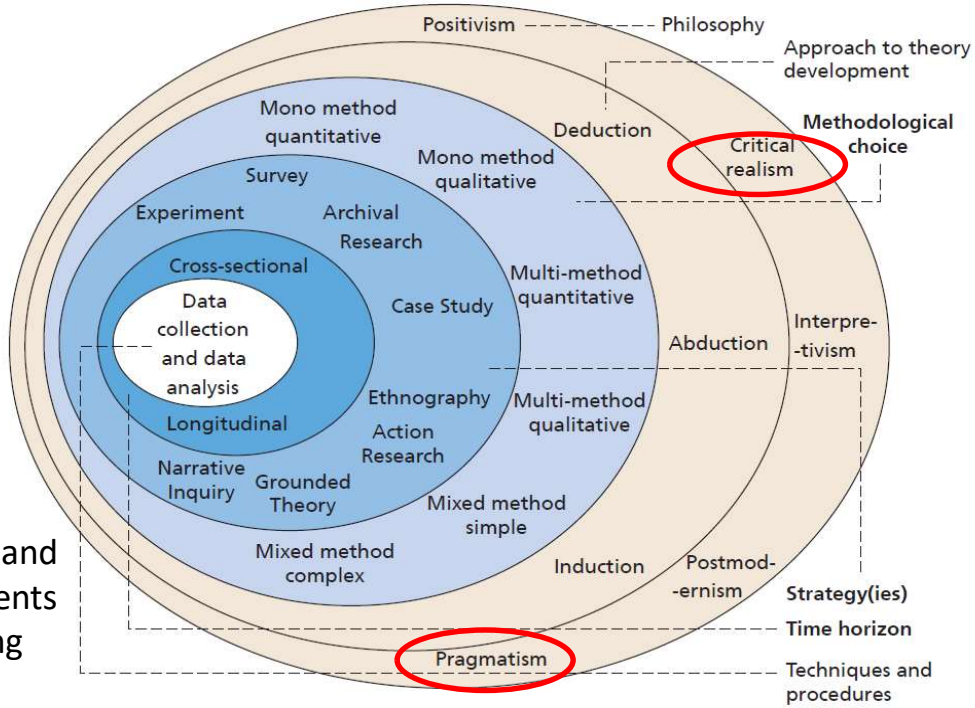
Critical realism has implications for research design that may sup-port the use of mixed methods research.

Characteristics

Mixed methods research draws from the characteristics of both quantitative research and qualitative research

Figure 5.1
The research onion

Critical Realism (CR) distinguishes between the 'real' world and the 'observable' world. The 'real' can not be observed and exists independent from human perceptions, theories, and constructions.



Pragmatism considers words and thought as tools and instruments for prediction, problem solving and action.

Source: © 2018 Mark Saunders, Philip Lewis and Adrian Thornhill

5.6 Mixed methods research designs

Research Design

The principal mixed methods research designs are concurrent triangulation design, concurrent embedded design, sequential exploratory design, and sequential explanatory design

Details, see Saunders 184 f.

Mixed methods research draws from the characteristics of both quantitative research and qualitative research

- Structured observation
- Questionnaires, including structured interviewing
- Internet-mediated observation
- Videography
- Semi-structured and in-depth interviews including group and telephone interviews