

Theory Building

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NYT C01

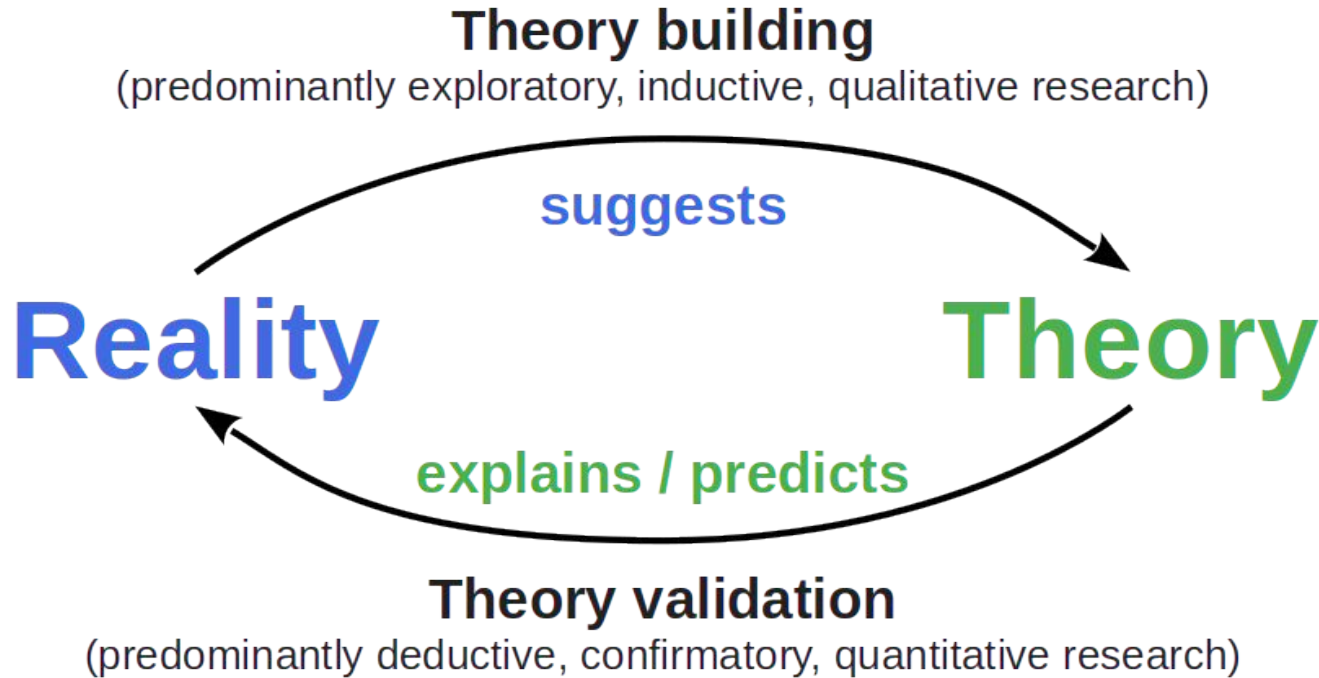
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Agenda

1. Theory building
2. Qualitative research
3. Example methodologies
4. Multi-method research
5. Mixed-methods research
6. Quality assurance

1. Theory Building

The Logic and Process of Science (Recap)



Purpose of Theory Building

The purpose of scientific theory building is to

- Create, build out, and evaluate a theory that
 - Correctly explains and/or predicts reality
 - Can be continuously tested
 - In a cost-efficient way

Theory Building Research

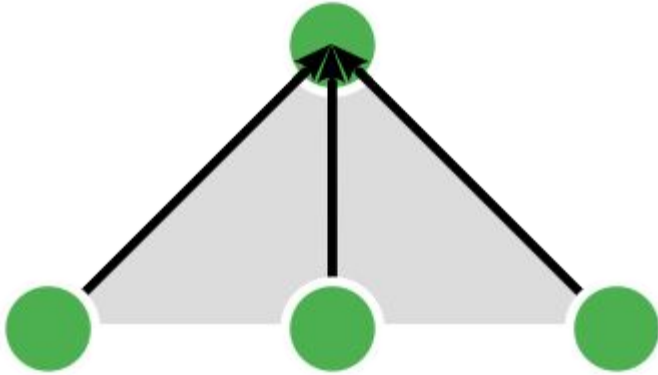
Theory building research is

- Exploratory
- Inductive
- Qualitative

Inductive Reasoning

Inductive research is based on **inductive reasoning** which is

- Abstracting from data by recognizing patterns and drawing conclusions

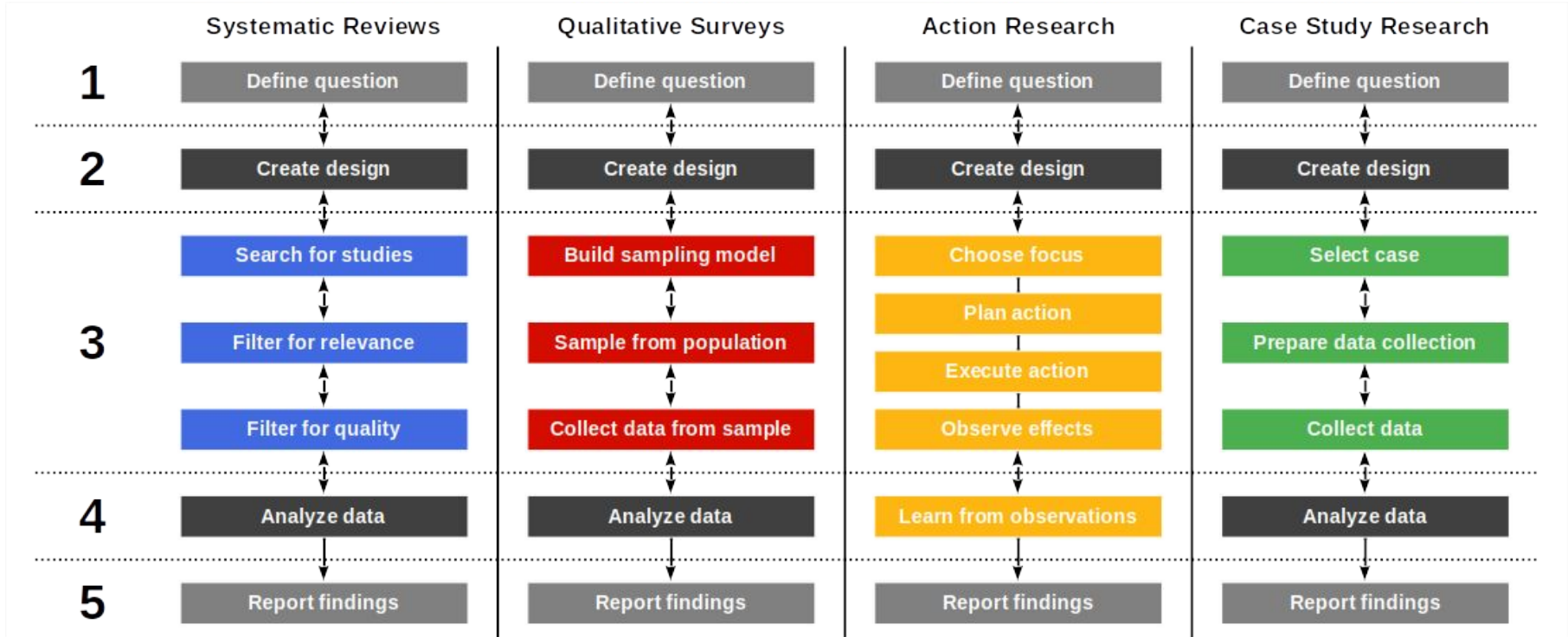


Theory Building Process

The **theory building process**

- Is iterative
- Is incremental
- Mitigates risk
- Never ends

Theory Building Processes by Methodology



2. Qualitative Research

Base Terminology (Recap)

Researchers use a research methodology

- Recap: A start-to-finish framework for performing theory building

To create a research design

- Recap: A process description for answering a research question

That utilizes research methods

- Recap: A method answering a type of research question

Which combine research practices

- Recap: A way of doing something with a defined outcome

What Makes a Research Design a Qualitative Design?

1. The **theory building** purpose
2. The use of **theoretical sampling** in data collection
3. The acquisition and use of **qualitative data**

Qualitative vs. Quantitative Research Methods (Recap)

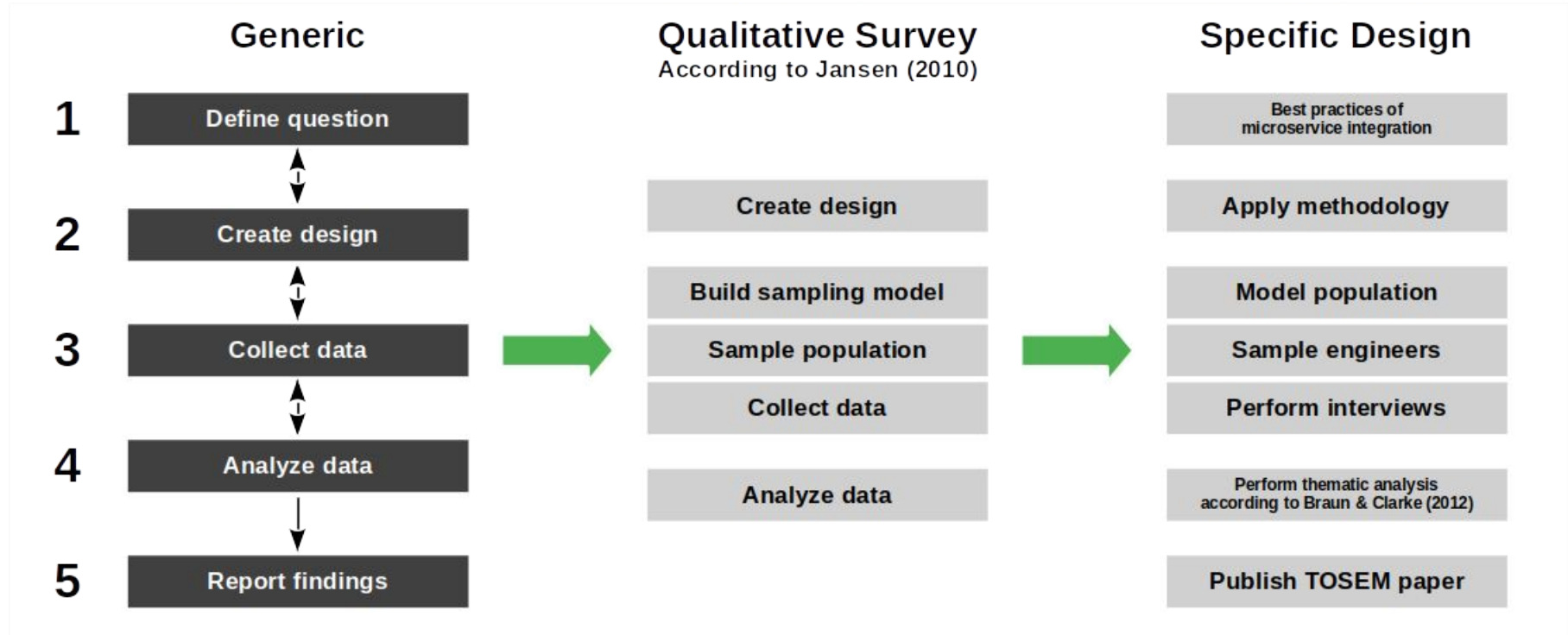
Research method	Qualitative	Strongly aligned	N / A
	Quantitative	Infrequently used	Strongly aligned
		Theory building	Theory validation
Research purpose			

Example Qualitative Research Methodology (Recap)

The **qualitative survey** according to Jansen (2010)

1. Write research protocol
2. Build sampling model
3. Sample for theory building
4. Perform interviews
5. Analyze transcriptions
6. Determine saturation
7. Iterate or conclude

Example Research Design Refinement



3. Example Methodologies

Research Methodologies

Main categories

- **Systematic survey [1]**
- **Qualitative survey [2]**
- **Action research**
- **Case study research**
- Grounded theory
- Ethnographies

Not a methodology

- Introspection

[1] Most commonly: Literature survey

[2] Most commonly: Interview study

Action Research

Action research is a research methodology in which the researcher

- Applies a theory being built to help create a desired outcome
- Evaluates the theory as to its trustworthiness

Participatory action research is action research in which the researcher

- Joins a case (organization) to work side-by-side with practitioners

Action Research Process

1. Identify problem
2. Iterate over action loop
 - a. Choose focus
 - b. Plan action
 - c. Execute plan
 - d. Observe effects
 - e. Learn from observations
3. Specify learning

Example (Specific) Action Research Methodologies

- Lewin (1946): Action research
- McIntyre (2007): Participatory action research
- Kemmis et al. (2014): Critical participatory action research

Case Study Research

Case study research is a research methodology in which the researcher

- Investigates a (contemporary) phenomenon in its original context
- Where the boundaries between phenomenon and context are blurry

Case Study Research Process

1. Plan
2. Perform
 - a. **Design** (case selection, units of analysis, propositions, questions, logic, criteria)
 - b. **Prepare** (research protocol, ethics approval, conflicts of interest, pilot case)
 - c. **Collect** (multiple data sources, case study database, chain of evidence)
 - d. **Analyze** (qualitative data analysis, case description, rival explanations)
3. Report

Example (Specific) Case Study Research Methodologies

- Eisenhardt (1989): Case study research
- Yin (2009): Case study research
- Runeson et al. (2012): Case study research in software engineering

Research Paradigms

- Analytical research
 - Research is detached; goal is understanding
- Action research [1]
 - Research is involved; goal is improving
- Design science research
 - Research is applied; goal is innovation

4. Multi-Method Research

Multi-Method(ology) Research Designs

A **multi-method research design** is a research design that

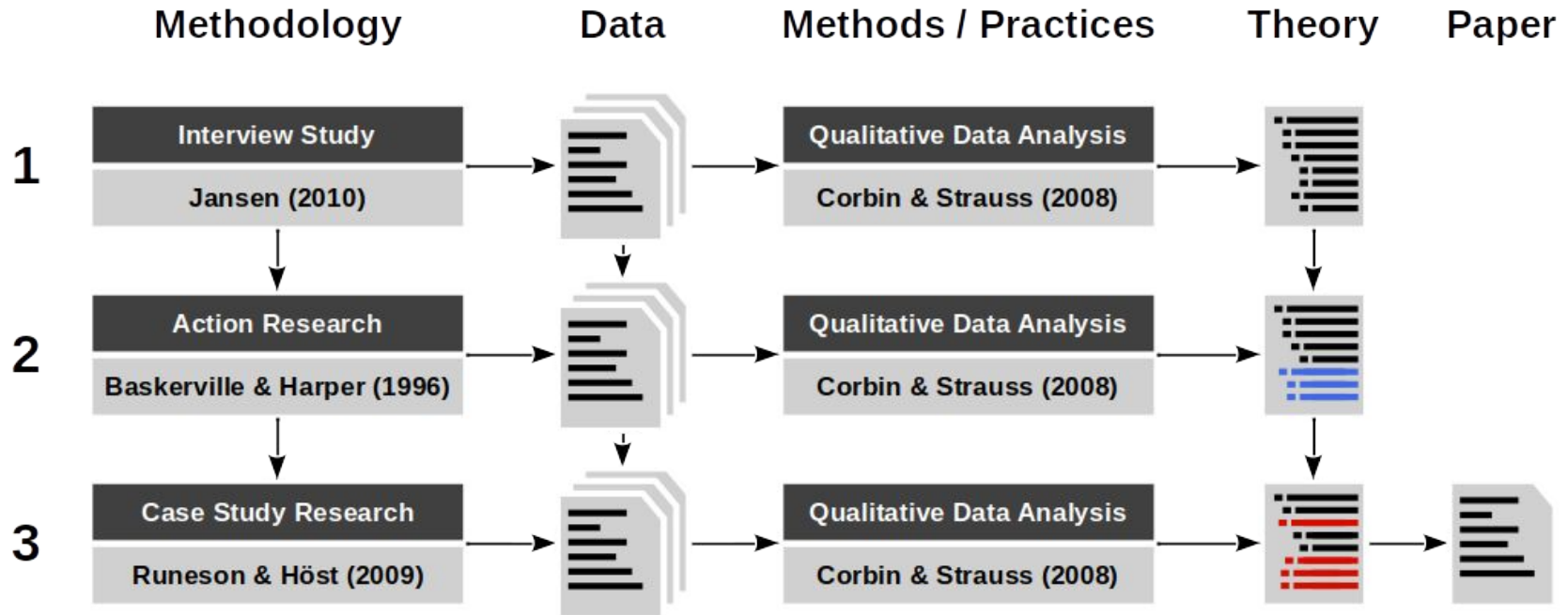
- Uses multiple methodologies and methods
- Within either theory building or validation research

Example Multi-Method Research Design

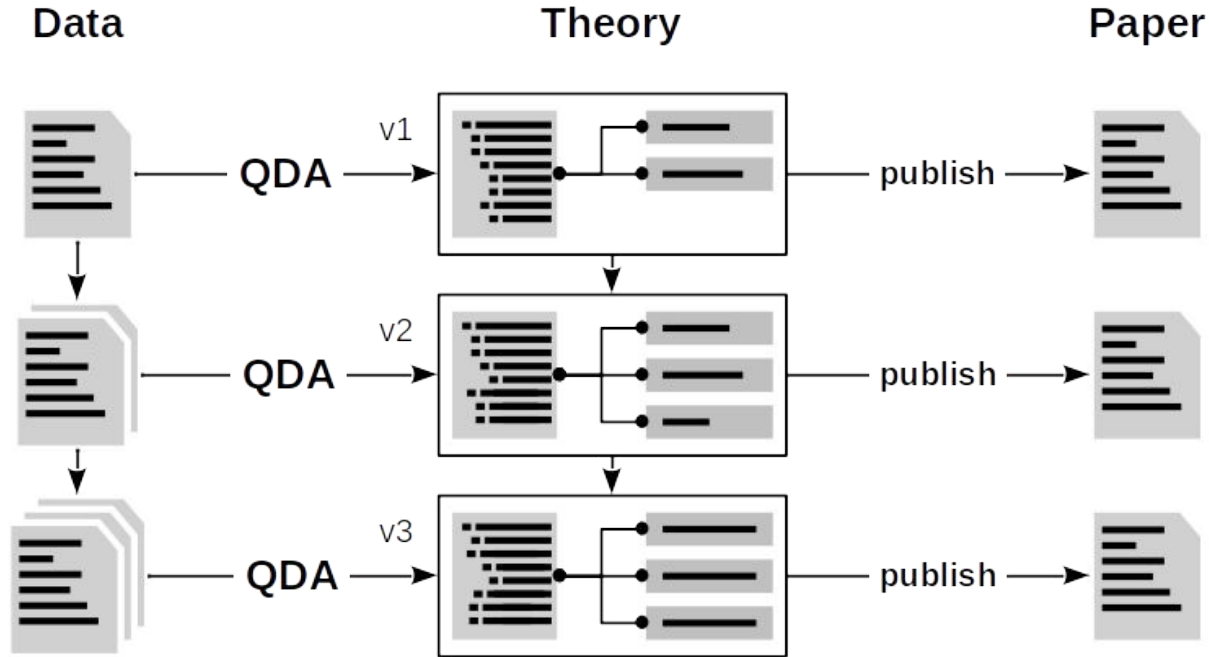
Best practices of microservices integration

1. Theory creation
 - a. Jansen (2010): The qualitative survey
2. Theory build-out
 - a. Baskerville & Harper (1996): Participatory action research
3. Theory evaluation
 - a. Runeson & Höst (2009): Case study research

Theory Build-out and Triangulation Using Multi-Method Research



The Importance of Qualitative Data Analysis



5. Mixed-Methods Research

Mixed-Methods Research Design

A **mixed-methods research design** is a research design that

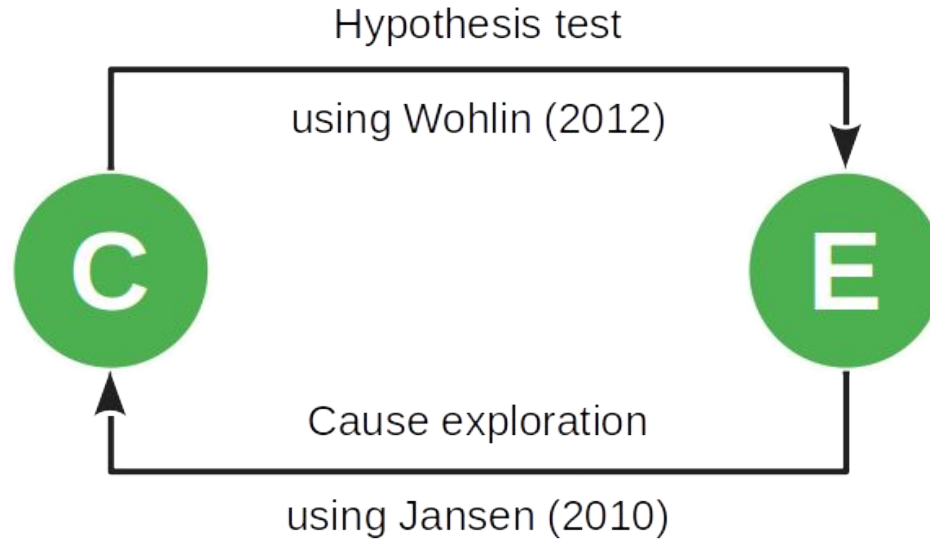
- Combines qualitative with quantitative research methods

Example Mixed-Method Research Design

Novel programming language feature

1. Hypothesis creation
 - a. Jansen (2010): The qualitative survey
2. Hypothesis test
 - a. Ko et al. (2015): Controlled experiment
3. Theory building
 - a. Jansen (2010): The qualitative survey

Causal Analysis / Correlation and Causation



6. Quality Assurance

Quality Criteria for Research Methods (Recap)

Intuition	Qualitative research	Quantitative research
Truth value	Credibility	Internal validity
Applicability	Transferability	External validity
Consistency	Dependability	Reliability
Neutrality	Confirmability	Objectivity

Trustworthiness

Credibility is

- The degree of confidence in the truth of the findings

Transferability is

- The degree to which findings can be transferred to another context

Dependability is

- The degree to which findings are stable over time

Confirmability is

- The degree to which the findings can be confirmed by other researchers

Establishing Quality (Not Assuring it)

Quality in qualitative research is “established”

- Quality is proactively baked into the methods

Practices for Establishing Quality [1]

Credibility

- Prolonged Engagement
- Persistent Observation
- (Different forms of) triangulation
- Peer debriefing
- Negative case analysis
- Referential adequacy
- Member-checking

Transferability

- Thick description

Dependability

- Inquiry audit

Confirmability

- Confirmability audit
- Audit trail
- Triangulation
- Reflexivity

Summary

1. Theory building
2. Qualitative research
3. Example methodologies
4. Multi-method research
5. Mixed-methods research
6. Quality assurance

Thank you! Any questions?

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