

Research Methods Workshops

Data Analysis: Session 1

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Learning outcomes

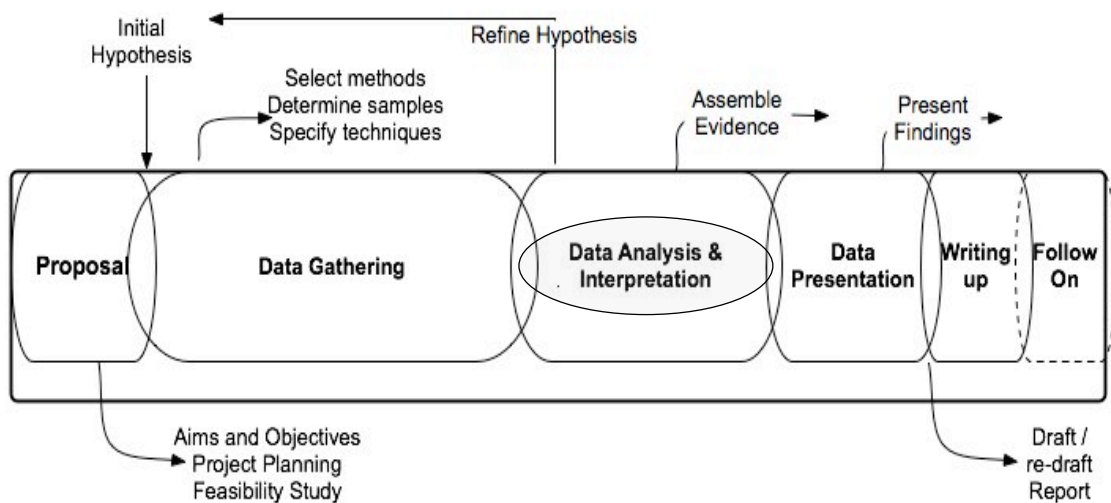
By the end of this Session, you will be able to:

- Understand the role of data analysis in research.
- Outline the key steps of the research process.
- Discuss the relevance of *ontology* and *epistemology* to research design.

The research process

- Identifying a a question to be answered / hypothesis to be tested / problem to be solved.
- Determining what kind of information is needed to answer that question (*ontology*).
- Determining what methods are best for generating that information (*epistemology*).
- Getting the information using the chosen methods (*data gathering*).
- Converting raw data into usable information (evidence) (*analysis & interpretation*).
- Drawing and presenting conclusions from the information (*presentation*).
- Validating the evidence provided.

Data Analysis – Where in the research process?



Ontology

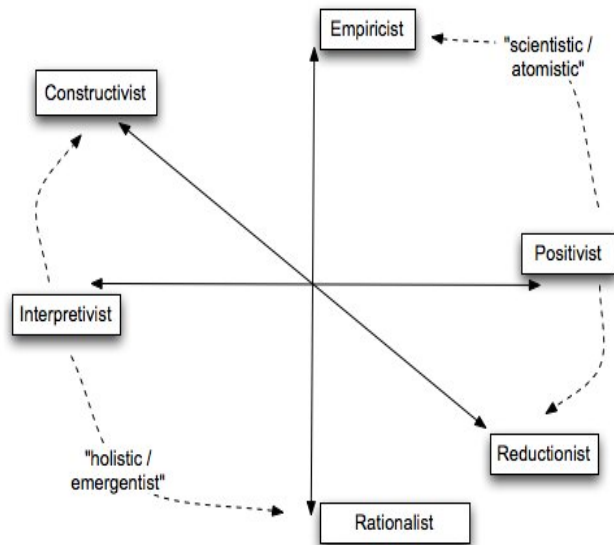
- Ontology is, literally, the study of *what there is*.
- Ontological considerations in research:
 - Who you are / how do you position yourself in relation to the data sources you need?
 - Who are your data subjects? (*Sample*) What are the data items you need from them?
 - What is the relationship between you and the subjects of your research?
 - Which data units will you gather and analyse? (e.g. preferences, attitudes, decisions, experiences, processes, behaviours, values, prices, quantities, frequencies, variations . . . – in individuals or in groups)
 - Which states of another person can you observe as a researcher?
 - How much of another person's states can they describe themselves? Can you verify these?
 - Are my data sources 'representative'? How can I select a suitable sample to ensure my research data is 'typical' of a population?

Epistemology

- Epistemology is the study of knowledge – what do we know and how do we know it?
(*"episteme"* = (Classical Greek) *"knowledge"*)
- In practical research, epistemology concerns the methods we select for gathering, analysing and presenting evidence (our '*methodological framework*').
- It also concerns the tests we carry out to establish the validity and soundness of the evidence we present.

Some epistemological frameworks

- **Empiricism** – knowledge is based on experience, observing something through the five senses.
- **Rationalism** – knowledge is acquired through rational deductive processes or is derived from axioms.
- **Constructivism** – knowledge is ‘constructed’ through social interaction, convention and perception (‘inter-subjective experience’ and consensus).
- **Reductionist** – regards ‘explanation’ as breaking complex items into simplest components (e.g. molecular chemistry).
- **Positivism** – to be scientifically acceptable, knowledge (theories) have to be based on observable, testable evidence.
- **Interpretivism** – in the human sciences, knowledge (theories) require common understanding, intuition, empathy and positional interpretation.



Outline of Data Analysis Workshops

- 1 Basics of data analysis - types of data; the framing exercise: determining ‘ontology’ (data types, data sources, factor analysis of variables) and ‘epistemology’ (methods)
- 2 Basic principles of quantitative data analysis: descriptive versus inferential statistics. Mean, Median, Mode and Standard Deviation - and when to use them. Properties of distributions.
- 3 Analysis of qualitative data - deductive versus inductive approaches: unitising qualitative data; pattern-matching and explanation-building; content analysis, thematic analysis, grounded theory.

- 4 Demonstration of use of CAQDAS (NVIVO, Atlas) for qualitative analysis.

- 5 Analysis of variance: ANOVA -- confidence levels and regression analysis.

- 6 Sampling: sampling frames and sampling methods (probabilistic and non-probabilistic).

Exercises:

- Group 1: Hypothesis framing.
 Group 2: Averages, frequency, distributions.
 Group 3: Coding textual data.
 Group 4: Regression analysis,
 Group 5: Sampling methods.