Lecture 2: Research Design

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Overview of Research Design

• Research design/method is the plan with which we outline how the research is structured and undertaken
  – empirical vs non-empirical
  – quantitative vs qualitative vs mixed methods

• In the research report, this is specified in Chapter 4 (Design and Methodology)
  – need to clarify what design/method you have chosen and why
# Categorisation of Research Approaches

<table>
<thead>
<tr>
<th>Teleological Type</th>
<th>Research Category</th>
<th>Linkage to Theory</th>
<th>Data Acquisition</th>
<th>Data Analysis</th>
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</thead>
<tbody>
<tr>
<td>Descriptive Study</td>
<td>Basic Research</td>
<td>Theory Building</td>
<td>Case Study</td>
<td>Qualitative Analysis</td>
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<tr>
<td>Exploratory Study</td>
<td>Applied Research</td>
<td>Theory Testing</td>
<td>Survey</td>
<td>Descriptive Statistics</td>
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<tr>
<td>Explanatory Study</td>
<td>Experimental Development</td>
<td>Theory Application</td>
<td>Experimental</td>
<td>Inferential Statistics (incl. Hypothesis Testing)</td>
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<td>Policy Research</td>
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<td>Statistical Modelling</td>
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<td>Programme Evaluation</td>
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<td>Historical Research</td>
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<td>Simulation based on Models</td>
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Types of Data Acquisition

- **Type of Study**
  - **Empirical**
    - Collect and use primary data (surveys, experiments, case studies, ethnographic studies)
  - **Non-Empirical**
    - Analyse existing data (secondary)

- **Text Data** (discourse analysis, content analysis, textual criticism, historical studies)
- **Numeric Data** (data analysis, statistical modelling)

Taxonomy of Non-Empirical Research Techniques

- Review of Existing Literature
- Conceptual Research (Contemplative, ‘Armchair’)
- Futurism
- Scenario-Building
- Game-Playing or Role-Playing
- Analytical and Simulation Modelling
Possible ‘Interpretations’ of Non-Empirical

• Not based on
  – any evidence from the real world
  – new evidence from the real world (‘primary data’), but on data previously gathered, possibly for another, quite distinct purpose (‘secondary data’)

• Often associated in people’s minds with the ‘humanities’ and ‘natural philosophy’
  – actually prevalent in many sciences as well

• Risks being detached, ivory-tower thinking, and producing results irrelevant to the real world
QUANT, QUAL and Mixed Methods

• Topic covered in next few slides
• Suitable texts:
Factors to Consider

• The research design is guided by the type of research question

• The following dimensions are also useful to consider
  – generalisation vs contextualisation
  – validation (explanatory) vs discovery (exploratory)
  – diachronic (longitudinal) vs synchronic (snapshot)
## Quantitative vs. Qualitative Research

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<tr>
<th>Objective</th>
<th>Qualitative Research</th>
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<tr>
<td>Objective</td>
<td>To develop an initial understanding of underlying reasons and motivations; to provide insights into the setting of a problem, generating ideas and/or hypotheses for later quantitative research; to uncover prevalent trends in thought and opinion</td>
<td>To quantify data and generalize results from a sample to the population of interest; to measure the incidence of various views and opinions in a chosen sample</td>
</tr>
<tr>
<td>Sample</td>
<td>Usually a small number of non-representative cases with purposive sampling</td>
<td>Usually a large number of cases representing the population of interest with randomly selected respondents</td>
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<tr>
<td>Data collection</td>
<td>Unstructured or semi-structured techniques e.g. individual depth interviews or group discussions</td>
<td>Structured techniques such as online questionnaires, face-to-face or telephone interviews</td>
</tr>
<tr>
<td>Data analysis</td>
<td>Content analysis and non-statistical; descriptive and interpretive</td>
<td>Statistical data is usually in the form of tabulations (tabs); findings must describe level of significance and error</td>
</tr>
<tr>
<td>Outcome</td>
<td>Exploratory and/or investigative; findings are not conclusive and cannot be used to make generalizations about the population of interest</td>
<td>May be used to recommend a final course of action if the results are significant; sometimes followed by qualitative research which is used to explore main findings in more detail</td>
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</table>
Qualitative Approaches

• Ideal when collecting information on the meanings that people attach to their experiences and on the ways they express themselves; suited to exploring feelings, opinions and values of people and groups
• Construction of argument is critical in qualitative analysis
• Ask penetrating questions, and listen well
• Have an eye for detail, and do rigorous analysis
The Strength of Qualitative Research

• Main focus of QUAL is to understand and explore situations, feelings, perceptions, attitudes, values, beliefs and experiences
• The studies are flexible and emergent, non-linear and non-sequential
• The studies often have an open frame of enquiry
• QUAL studies are frequently inductive
• Examples of QUAL designs include ethnography, narrative research, phenomenology, grounded theory
Ethnographic Research

- holistic and systematic study of people and cultures in naturally occurring settings or ‘fields’ by means of methods that capture their social meanings and ordinary activities
- designed to explore cultural phenomena, understand the social and cultural life of people
- include a brief history, and an analysis of the terrain, the climate, and the habitat
- it should be reflexive, have an aesthetic impact on the reader, and express a credible reality
Narrative Analysis

- Narrative research has as its basis, the assumption that narratives provide an important means by which human beings understand and make sense of their lives and actions.
- For the narrative analyst, an awareness of language, its meaning and use in describing experience is important, as is the use of social context and how people draw on cultural resources in telling their stories (Esterberg, 2002).
Interpretive Phenomenological Analysis

• Approach to qualitative research which it aims to offer insights into how a given person in a given context makes sense of a given phenomenon.

• Usually these phenomena relate to experiences of some personal significance - such as a major life event, or the development of an important relationship.

• It has its theoretical origins in phenomenology and hermeneutics
  – Hermeneutics is the philosophy and methodology of text interpretation
Participatory Action Research

• A form of case study or survey which requires closer engagement between researcher and research subject(s)
  - “we are talking about the active participation of the exploited in an analysis of their own reality”

• Subjectivity becomes a pursuit, not something to be avoided

• A form of liberation epistemology!
  - domination of the masses rooted in control of means of material production but also the social power to determine what is useful knowledge
Case Study

- Definition: an extensive examination of a single instance
- Aim: understand the subject in sufficient detail to enable generalisations
- Implementation: use multiple methods, ask multiple questions, must define the reference frame, external validity is clearly challenging (by definition!).
  - mostly qualitative research
  - ethnographic research (qualitative research design aimed at exploring cultural phenomena)
Case Studies

• “A case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident.”

• An in-depth examination of a single subject or phenomenon
  – MUST use multiple sources of evidence (interviews, archival, direct observation, participant observation)

• Generalisation is a challenge!
Types of Case Study

- Snapshot (one point in time)
- Longitudinal (multiple points in time)
- Pre-Post (before and after)
- Patchwork (multiple entities with mixture of above)
- Comparative (multiple entities)
Aspects of Case Studies

• Analytical techniques include:
  – Pattern matching
  – Explanation building
  – Time-series analysis
  – Logic models
  – Cross-case synthesis
Survey

- Definition: a (mostly) positivistic research design in which a sample of subjects is drawn from a population and studied to make inferences about the population

- Aim: to understand the frequency distribution of a genotype, phenotype, opinion, fashion, etc. within a population as a function of demography or other variables

- Implementation: key issue is the selection of the sample, also sampling frequency in time, form of data collection (interview, observation, etc.)
Survey Research

• 4 important steps:
  – Translation of research questions into variables
  – Choice of appropriate sampling method(s)
  – Choice of appropriate data collection method(s)
  – Choice of appropriate data analysis method(s)

• All 4 steps MUST BE CLEARLY DEFINED in your research design
Experimental

- Definition: a positivistic methodology based on hypothesis testing
- Aim: manipulation of independent variable(s) to observe effect on dependent variable(s)
  - possible existence of causality is a basic assumption
- Implementation: conducted in an artificial (laboratory) or natural setting (with strict control of variables). Often involves use of control with significance testing
Historical (Archival and Oral)

- **Definition**: investigation of historical materials, either written, multimedia, oral, etc.
- **Aim**: to reveal patterns which may be political, social, epidemiological, etc.
- **Implementation**: access and analysis of archival material supported by a strong methodological framework
  - important to acknowledge this bias!
Other Designs

• Modelling

• Computer simulation
  – very important in understanding of multivariate systems in which causality is non-linear
  – examples are biological systems, economics, financial markets

• Quasi-experimental
  – empirical study used to estimate the causal impact of an intervention on its target population, specifically lacks the element of random assignment to treatment or control
  – random assignment is unethical or impractical
Sampling Methods; Step by Step

• Choose the ‘Unit of Analysis’
  – HEIs (not academics); note that respondents may not be equivalent to the unit of analysis (can be representatives)

• Population: ‘all members of a defined group’
  – HEIs

• Sampling: ‘selection of only a part of a research population’
  – Sampling frame: ‘those members of the population from whom the sample will be drawn’
    • public universities listed on DoE site

• Sample: ‘those members of the population from whom the data will be collected’
Quantitative Data Acquisition

- First step; define your variables
- Second step; categorise your variables
- Third step; design your sampling strategy
- Fourth step; collect the data!
- Final step; undertake the analysis using:
  - descriptive statistics
  - inferential statistics
  - correlation analysis
  - modelling
Nature of Measurement

• Measurement involves the construction of variables

• Very often, what we are attempting to measure cannot be measured directly
  – as a consequence we have to use indicators, proxy or surrogate variables (same meaning)

• Different levels of measurement
  – nominal, ordinal, interval, absolute, etc.
  – important for statistical analysis
Numerical Representation

• Representation of variables in coded form

• Nominal Scale
  – Numbers used for representation without implication of importance/order/scale (1 = female; 2 = male)

• Ordinal Scale
  – Numbers are used for classification and does convey order but not exact values (low = 1, medium = 2, high = 3)

• Interval Scale
  – Numbers are equidistant but do not necessarily have a true zero point (deg C)

• Ratio Scale
  – Numbers are equidistant and have a true zero point (deg K) value).
## Summary of Numerical Representations

<table>
<thead>
<tr>
<th>Ordinal</th>
<th>Interval</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ordinal</td>
<td>Equal Differences</td>
<td>Even Proportions</td>
</tr>
<tr>
<td>Nominal</td>
<td>Hierarchy</td>
<td>Hierarchy</td>
</tr>
<tr>
<td>Distinction</td>
<td>Distinction</td>
<td>Distinction</td>
</tr>
<tr>
<td>Warm or Cold</td>
<td>Cold &lt; Mild &lt; Warm &lt; Hot</td>
<td>Centigrade</td>
</tr>
</tbody>
</table>

- **Property**
  - Nominal: Hierarchy, Hierarchy, Hierarchy
  - Distinction: Distinction, Distinction
  - Warm or Cold: Cold < Mild < Warm < Hot, Centigrade, Kelvin

**Descriptor**
Sampling and Research Populations
Rules of Thumb

- At least 10 cases per variable
- At least 30 cases for statistical analysis
- Often resources $<<$ desired sample size
Questionnaire Design

• The first step in designing a questionnaire is to create a conceptual model
  – your framework of analysis which has been derived from your synthesis of the literature and your understanding of the important variables/the relationships between these

• The second step is to produce the questionnaire
  – the introduction, the statement of informed consent, the questions and responses, and the ‘look and feel’ format
  – you could use SurveyMonkey (www.surveymonkey.com), Google Sheets or http://kwiksurveys.com/ or http://freeonlinesurveys.com/

• The third step is to pre-test the questionnaire.
Video – Qualitative Methodology

• Q1; in which discipline does the researcher work?
• Q2; based on the input from her first supervisor, was he a quantitative or qualitative methodologist?
• Q3; given her research interests, how would you describe her research methodology?
  – phenomenology
  – constructivist
  – positivist
  – narrative based enquiry
• Q4; why did she switch from quant to qual?