Session Three:
Research Design

Professor David Walwyn
Session Four: The Research Design

• Overview of Research Design
• Category of Research (Lecture 1)
  – basic, applied, experimental development, programme evaluation, policy-oriented
• Source of Data (Lecture 4)
  – empirical vs. non-empirical
• Type of Data Acquired (Lecture 4 and 6)
  – quantitative vs. qualitative
• Means of Acquiring Data (Lecture 5)
  – case study research, survey research, experimental, statistical modelling and computer simulation studies
Overview of Research Design

• Saunders Chapter 5: research design 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 your research report, this is specified in Chapter 4 (Design and Methodology)
  – you must learn the language
  – need to clarify what design you have chosen and why
Types of Research Designs

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)

Babbie and Mouton 1998
Taxonomy of Non-Empirical Research Techniques

• Review of Existing Literature
• Conceptual Research (Contemplative, ‘Armchair’)
• Futurism, especially Delphi Rounds
• Scenario-Building
• Game-Playing or Role-Playing
• Analytical and Simulation Modelling
Approaches to Empirical Research

• QUANT AND QUAL
  – Qualitative vs quantitative
  – Mixed methods

• Types of designs
  – Experimental
  – Surveys
  – Case studies
  – Ethnographic studies
  – Evaluation research
  – Participatory action research (actually a separate paradigm)
Some 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)
Epistemology is a study of knowledge. Personal Epistemology encompasses Realism and Relativism. Realism is used to measure impacts. Relativism is also used to measure impacts. Interpretative Phenomenological Analysis is driven by Research Methodology. Research Objective and Questions is associated with Positivism. Knowledge consists of Procedural Knowledge and Acquaintance Knowledge. Procedural Knowledge consists of Acquaintance Knowledge. Scientific Research is part of Mixed Methods. Scientific Research is driven by Research Design, which feeds into Quantitative Methods and Qualitative Methods. Research Design consists of Quantitative Methods and Qualitative Methods. Quantitative Methods is part of Scientific Research. Research Methodology is associated with Constructivism, which feeds into Scientific Research. Constructivism is associated with Scientific Research.
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
## Quantitative vs. Qualitative Research

<table>
<thead>
<tr>
<th>Objective</th>
<th>Qualitative Research</th>
<th>Quantitative Research</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objective</strong></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><strong>Sample</strong></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>
</tr>
<tr>
<td><strong>Data collection</strong></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><strong>Data analysis</strong></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><strong>Outcome</strong></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>
</tr>
</tbody>
</table>
Mixed Methods

- Combination of QUANT and QUAL
- In reality already widely used especially in social science
  - could consider a literature review as qualitative research
  - generating new (to myself) knowledge!
  - in other words all research projects embrace mixed methods (in a wider definition)
- Collection or analysis of both qualitative and quantitative data in a single study
  - the data are collected concurrently or sequentially and are later integrated
Common Forms

• The most common form is to use qualitative methods to develop theory or hypothesis which is then validated in a quantitative study (Exploratory Sequential design)

• Can also use mixed methods to clarify or enhance the conclusions of the data analysis (e.g. explanation of causation) (Explanatory Sequential)

(see Ozawa et al. 2015. 10 best resources on mixed methods research in health systems. Health Policy and Planning, 29: 323-327)
When Should You Use Mixed Methods?

• When you need to triangulate (QUANT or QUAL on its own is inadequate)
• When you want to integrate a variety of theoretical perspectives
• When you want to validate or generalise the results of an initial theory
• When you want to enhance the conclusions of a quantitative study
Mixed methods research begins with the assumption that investigators gather evidence based on the nature of the question and theoretical orientation. Quantitative (mainly deductive) methods are ideal for measuring pervasiveness of “known” phenomena and central patterns of association, including inferences of causality. Qualitative (mainly inductive) methods allow for identification of previously unknown processes, explanations of why and how phenomena occur. Mixed methods research, then, is more than simply collecting qualitative data from interviews, or collecting multiple forms of qualitative evidence (e.g., observations and interviews) or multiple types of quantitative evidence (e.g., surveys and diagnostic tests). It involves the intentional collection of both quantitative and qualitative data and the combination of the strengths of each to answer research questions.
Philosophy in Mixed Methods

• Mixed methods researchers use and often make explicit diverse philosophical positions. These positions often are referred to as dialectal stances that bridge post-positivist and social constructivist worldviews, pragmatic perspectives, and transformative perspectives.
How Should a Mixed Methods Study be Designed?

• The same way you design any study!
  – Consider your philosophy and theory
  – Consider the research questions and the reasons for your choice of method
  – Develop your consistency matrix (see next slide)
  – Consider if you have resources (e.g., time, financial resources, skills)
Types of Mixed Methods Design

<table>
<thead>
<tr>
<th>Mixed Methods Research Designs</th>
<th>Convergent Parallel</th>
<th>Quan</th>
<th>And</th>
<th>Qual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exploratory Sequential</td>
<td>Quan</td>
<td>Then</td>
<td>Qual</td>
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</tr>
<tr>
<td>Embedded</td>
<td>Qual/Quan</td>
<td>Within</td>
<td>Quan/Qual</td>
<td></td>
</tr>
<tr>
<td>Transformative</td>
<td>Quan</td>
<td>Then</td>
<td>Qual</td>
<td></td>
</tr>
<tr>
<td>Multiphase</td>
<td>Qual</td>
<td>Then</td>
<td>Quan</td>
<td></td>
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(Ozawa and Pongpirul, 2014)
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
Class Exercise

• Listen to the following YouTube clips:
  • https://www.youtube.com/watch?v=lSAnNs-IoSQ
  • Answer these questions:
    – was the definition of research adequate?
    – what is missing from the table on QUANT vs QUAL
## Summary of Research Approaches

<table>
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<tr>
<th>Relevance</th>
<th>Teleological Type</th>
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<td>Descriptive Study</td>
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**Example:**

- **Descriptive Study**
  - Basic Research
  - Theory Building Research
  - Case Study
  - Qualitative Analysis
- **Exploratory Study**
  - Applied Research
  - Survey
  - Descriptive Statistics
- **Experimental Development**
  - Experimental Research
  - Experimental
- **Policy Research**
  - Theory Testing Research
  - Text, Numerical, Speech
- **Programme Evaluation**
  - Theory Application Research
  - Historical Research
  - Simulation based on Models

### Apply to Worked Example 1

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- **Data Analysis**
  - Qualitative Analysis
  - Descriptive Statistics
  - Inferential Statistics (incl. Hypothesis Testing)
  - Statistical Modelling
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.)
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?

• 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
The Delphi Technique
(A Limited Survey!)

• Delphi, Greece: private citizens and public officials would come to consult the oracle there, who was said to speak with the words of the Apollo.
The Delphi Technique

Multi-round questionnaire series.

Design questionnaire

Obtain and revise individual expert opinions

Combine individual expert opinions

Repeat for a number of rounds

Final report
The Delphi Technique

• Delphi encourages panelists to attempt to change the opinions of other panelists.

• How do you know if the collective judgment of the panelists are right?
  – Experts can also be wrong (logjam of dogma)
Wider Survey Research

- Widely used (and abused!) by MEM/MPM students
- 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
Research Question to Variable

• Problem Statement: “Private work by academics is considered to negatively impact on research productivity of HEIs”
  – what are the trends in research output of South African HEIs and some of the leading HEIs overseas?
    • output of research students (PhDs and Masters) and publications in accredited journals
  – what is the extent of private work by academics?
    • time spent on private work and associated revenue
  – are the research outputs of HEIs affected by levels of private work?
    • causative relationship between research output and private work
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’
Research Populations

Population

Frame

Sample
Sampling Techniques

• **Probability (Random)**
  – Simple random sampling (groups are ignored)
  – Stratified (random) sampling
  – Cluster sampling (two-stage sampling; clusters are randomly selected and then elements selected randomly)
  – Systematic sampling (elements selected on a specified basis – say every fifth element)
  – Probability-proportional-to-size sampling

• **Non-Probability**
  – Comprehensive
  – Purposive
  – Convenience or accidental
  – Quota (stratification with purposive or convenience)
  – Snowball sampling
SAMPLE SIZE

• REMEMBER TO LOOK AT THE MATERIAL FROM SEDGWICK FOR CALCULATION OF SAMPLE SIZE
**Sample Size**

- Most important question!
- The higher the REQUIRED reliability (+/-) (confidence interval) and the confidence level (inverse of error), the larger the sample
  - 90% level and 10% interval minimum for management studies

<table>
<thead>
<tr>
<th>Confidence Interval</th>
<th>90%</th>
<th>95%</th>
<th>99%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1%</td>
<td>6,765</td>
<td>9,604</td>
<td>16,576</td>
</tr>
<tr>
<td>5%</td>
<td>271</td>
<td>384</td>
<td>663</td>
</tr>
<tr>
<td>10%</td>
<td>68</td>
<td>96</td>
<td>166</td>
</tr>
<tr>
<td>20%</td>
<td>17</td>
<td>24</td>
<td>41</td>
</tr>
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</table>
Intervals and Levels

• The confidence interval is the plus-or-minus figure (reliability). For example, if you use a confidence interval of 4 and 47% of your sample picks an answer you can be "sure" that if you had asked the question of the entire relevant population between 43% (47-4) and 51% (47+4) would have picked that answer.

• The confidence level tells you how sure you can be for an assumed standard deviation in the sample. It is expressed as a percentage and represents how often the true percentage of the population who would pick an answer lies within the confidence interval.
Rules of Thumb

• At least 10 cases per variable
• At least 30 cases for statistical analysis
• Often resources << desired sample size
Case Study vs. Survey

Participatory Action Research (Revision)

• 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
Two Pictures to Use!

Relevance
- Social Relevance
- Scientific Relevance

Teleological Type
- Descriptive Study
- Exploratory Study
- Explanatory Study

Research Category
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- Applied Research
- Experimental Development
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Population
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Two Points to Remember!

• Completing your research project is not as simple as filling in the report template
• If you do a survey questionnaire on a 5-point Likert scale with at least 30 respondents, this does not mean that you have met the minimum standard for research design and should be awarded a pass mark
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?