5. Research Design

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C3 Theory

3.1 Introduction (signpost)

3.2 Theory Section 1
3.2.1 Synthesis from literature
3.2.2 H1
3.3Theory Section 1
3.3.1 Synthesis from literature
3.3.2 H2

3.nTheory Section n
3.n.1 Synthesis from literature
3.n.2 Hn

3.n+1Theoretical Framework
3.n+1.1 Synthesis from lit rev
3.n+1.2 Set out relationships between propositions and present f/w (may have added Hs)

3.n+2 Conclusion (signpost)

C4 Research Design

Addresses the question(s)....

Q: How do I design a research strategy (plus instruments)
which can reliably
gather data which I can process so that I get valid evidence
which can enable me to assess whether or not I can accept an hypothesis?

What options are available for this and which should I select and why?

NB:
Reliability
Validity
Generalisability
Significance
Ethics

From Theory to Research Design

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Chapter 4: Research Method – The role of this chapter is to address the following questions:

1. **Which method options are available? Why did you accept/reject these options?**
2. **What methods were associated with your approach to gathering evidence by which to test the theory in Ch 3**
3. **Why should the reader be convinced that your approach produced convincing evidence by which to accept/reject the hypotheses?**
4. **What methods have other published studies used to investigate similar phenomena [note: this is sometimes a subsection at the end of the lit review]? Were they considered for this study? Why/why not?**
5. **What data sources will you use? e.g what populations were sampled?**
6. **How was the data gathered and processed?**
7. **Why are your methods reliable and valid? Why did your methods produce data that was significant in some way?**
8. **Is the study generalisable? Why/why not?**
9. **How was the study conducted with participants' needs in mind (ethics)**

It also includes any topics needed in order to explain your methods

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RESEARCH DESIGN

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Identifying a Research Design: Some Options at this stage

- Some split between quantitative, qualitative and mixed (or "flexible")
- At the highest-level design decisions relate to:
  - Quantitative – descriptive, experimental, correlational. Uses statistics typically.
  - Qualitative/Mixed – illuminative, evaluative, biographical, narrational. Use of documentary and verbal evidence, sometimes quantitative elements are also included.

In technical work these often relate to technology validation strategies but BE CAREFUL, there should be theory to be tested.

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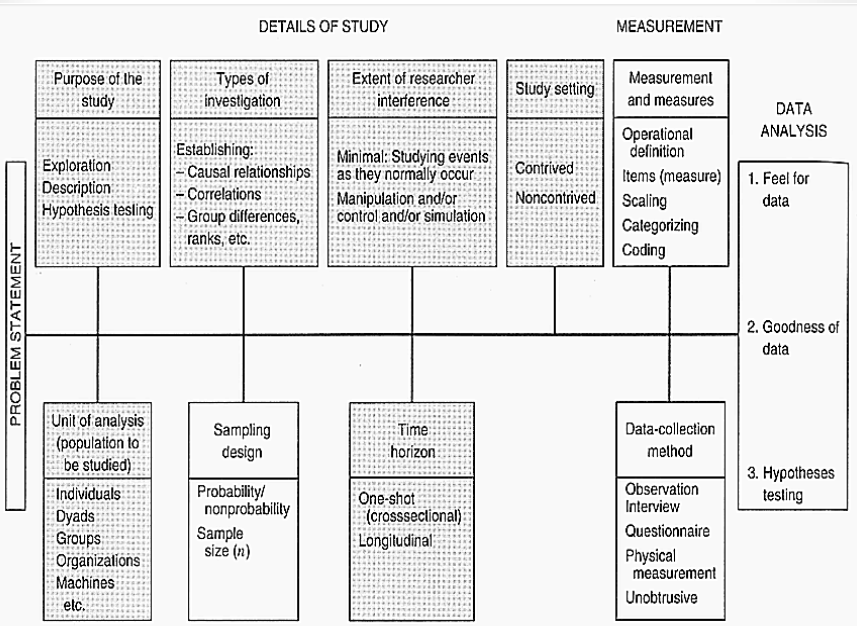
Research Design Overview



6

Quantitative/Fixed Study Method Chapter

- Details of procedures which would enable the reader to repeat the study. Besides the design and strategy issues the chapter should include:
- Participants:
  - Number , Selection process & Characteristics
  - Means of handling refusals/non-returns
- Apparatus/Materials
  - Description of tests/scales/observations schedules etc.
  - Development procedures for new instruments
  - Scoring/coding procedures
- Procedure
  - Observers/interviewers etc. characteristics and training
  - Reliability and validity of instruments/procedures
  - Description of setting
  - Verbatim instructions to participants
  - Duration, number and timing of sessions

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Qualitative /Flexible Study

Many different approaches are available but, besides what we have already discussed, a reader will expect to see:

- The kinds of data you obtained & Why these data were selected
- How the data was obtained, including issues of access and consent. Ethical issues are usually addressed in this context for many studies
- Methods used to collect the data & Why these methods were used
- The data analysis approach
- Discussion of reliability, validity and generalisability of the data (sometimes accompanied by philosophical issues – be careful some externals examiners will expect many of these issues to be dealt with in the literature review)
- Decisions made during the course of the study including changes of focus and direction
- Ethical issues raised by the study and procedures followed in order to address the ethics of the study

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Some Comments on Operational Matters: Gathering Data

- Be systematic and organised
  - Keep field and lab notes
- Lay out your notes in a way that will assist data analysis later on
  - Indexing schemes
- Never pretend you will remember what a particular data set was about

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Statistical Data Analysis Issues

- Know the data
  - you must tell the story of the data
- Use simpler rather than complex statistics
- Use packages (SPSS)
- Look for comparisons, contrasts and other patterns in the data
- Summarise the data and look for tentative conclusions
- Write up as you go along

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Experimental Research

- Investigates causal relationships or testing cause–effect hypotheses
- A cause–effect relationship is one where the occurrence of an event (the cause) causes the occurrence of another event (the effect).
- To establish a cause–effect relationship, three conditions must be present*:*

1. Temporal precedence: When the cause occurs, the effect must follow.
2. Covariation: Whenever the cause occurs, the effect must also occur and the stronger the cause, the stronger will be the effect.
3. No Extraneous Factors: The effect must be due to the cause and no other causes can explain the effect.

For more on experimental research see the handout "Experimental Research.pdf".

Note: For technical studies in computing research, factors associated with experimental research may be important for the research design.