

# Post Doctoral Research Fellowship

Research Group Workshop

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DUT, Steve Biko Campus

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**MANAGING YOUR TIME (M & D)**

**RESEARCH DESIGN**

**LINKING OBJECTIVES TO THE RESEARCH METHODS**

**RESEARCH METHODOLOGY – AN ENGINEERING PERSPECTIVE**

# **MANAGING YOUR TIME (M & D)**

# **RESEARCH DESIGN**

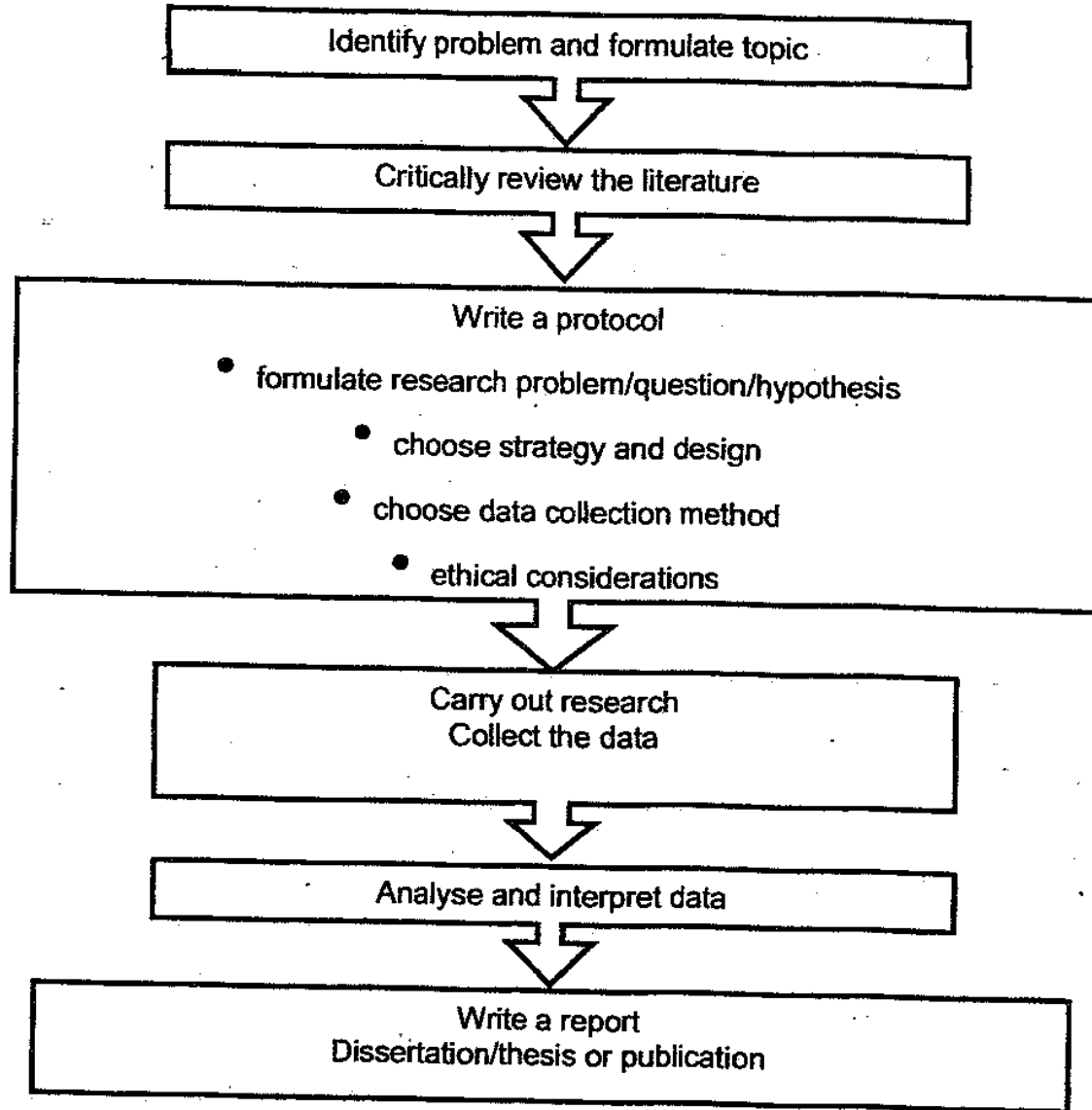
## **LINKING OBJECTIVES TO THE RESEARCH METHODS**

# Steps in the research process

- Qualitative and Quantitative Research

1. Identifying a research topic
3. Reviewing the literature
4. Stating the problem
5. Research question
6. Hypothesis
7. Research methodology
8. Plagiarism
9. Ethics

# Steps in the research process



# Qualitative and Quantitative Research

**Table 1.1:** Differences between quantitative and qualitative research (Leedy and Ommrod, 2005).

<b>Characteristic</b>	<b>Quantitative research</b>	<b>Qualitative research</b>
<b>Purpose</b>	Explain and predict. Confirm and validate. Test theory.	Describe and explain. Explore and interpret. Build theory.
<b>Nature</b>	Focussed. Known variables. Established guidelines. Pre-determined methods. Somewhat context free. Detached view.	Holistic. Unknown variables. Flexible guidelines. Emergent methods. Context-bound. Personal view.
<b>Nature of data</b>	Numeric data. Representative - large sample. Standardised instruments.	Textual based data. Informative - small sample. Non-standardised observation.
<b>Analysis of data</b>	Statistical analysis. Stress on objectivity. Deductive reasoning.	Search for themes. Analysis is subjective and potentially biased. Inductive reasoning.
<b>Presentation of data</b>	Numbers. Statistics. Scientific style.	Words. Narratives. Literary style.

# 1. Identifying a research topic: RESEARCH TOPIC REQUIREMENTS

- meet the standards for examination if the research project is part of the requirements for a qualification (Masters or Doctorate degree),
- the topic falls within the interest of the researcher (something that fascinates the researcher),
- the topic must have a clear link to theory in order to contextualise the study in terms of the broader research field,
- the necessary skills, resources, infrastructure and finances should be available,
- the research project should be achievable within the available time frame,
- is it possible to formulate a research question and objectives that are related to the topic,
- the research must contribute to the existing knowledge in the field of study,
- the possible outcomes should be likely to be symmetrical, that is of similar value whatever the outcome.



2. Reviewing the literature
3. Stating the problem
4. Research question
5. Hypothesis
6. Plagiarism
7. Ethics

# **RESEARCH METHODOLOGY**

- **AN ENGINEERING PERSPECTIVE**

# RESEARCH PROPOSAL

- ❖ **Field of Research and Provisional Title**
- ❖ **Context of the Research**
- ❖ **Research Problem and Aims**
- ❖ **Literature Review**
- ❖ **Research Methodology**
- ❖ **Plan of Research Activities**
- ❖ **Structure of Dissertation / Thesis Chapters**
- ❖ **Potential Outputs**
- ❖ **Key References**

<b>1. Field of Research and Provisional Title</b>
Provide the field of research and the provisional title of the research project, with a brief description, if the title is not self-explanatory.
<b>2. Context of the Research</b>
This section provides the general information regarding the research that will be undertaken and should make it clear why the problem is worth addressing. It sketches the background and, where appropriate, should provide a brief theoretical framework within which the problem is to be addressed. (Maximum length: 250 words)
<b>3. Research Problem and Aims</b>
This section should either set out the specific question(s) to which the student hopes to find an answer, or the research problems which are to be solved or state any hypotheses to be tested. In the case of open-ended topics in the Humanities, outline the subject/area/field to be critically investigated. It should indicate clearly what the research intends to achieve and the intended products of the research.
<b>4. Literature Review</b>
This section includes a brief review of the main, seminal literature sources (mainly scholarly journals, but text books, media articles, Internet and other sources can be used). Use the Harvard Method of referencing. Show clearly how the literature is linked to your topic, the problem statement and the research objectives. (Maximum length: 500 words)
<b>5. Research Methodology</b>
In this section the student is advised to state the research paradigm; qualitative/quantitative or both. The research approach/strategy will also need to be stated. e.g. Qualitative: Action research, developmental research, case study research, ethnographic research, grounded theory research, etc. Quantitative: Mathematical, modelling and simulation, experimenting, testing, etc. (Maximum length: 200 words)
<b>6. Plan of Research Activities</b>
Provide a summarised work plan for each year of the project giving information for each research activity per year, under the following headings: Activity Timeframes (target dates for the duration of the project)
<b>7. Structure of Dissertation / Thesis Chapters</b>
Briefly state the proposed content of each chapter in one clear sentence per chapter.
<b>8. Potential Outputs</b>
<ul style="list-style-type: none"> <li>• Provide details on envisaged measurable outputs (e.g. publications, patents, students, etc.);</li> <li>• Expected national and/or international acclaim for the research and contribution of research outputs to building the knowledge base;</li> <li>• Exploitability of outputs, e.g. applicability to community development, improved products, processes, services in SA, region and/or continent;</li> <li>• Expected effects of research results.</li> </ul>
<b>9. Key References</b>
List at least 20 key references which you have cited in the above sections using the Harvard referencing style (IEEE for Engineering students).



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