DESIGNING YOUR FIRST RESEARCH PROPOSAL
PREFACE

In June/July 1995 two research training workshops were held in Durban for students who were ready to design research proposals. The first workshop was organised by the Southern African Association for Research in Science and Mathematics Education (SAARMSE) for women in post-graduate degree programmes. The second workshop was organised by a group of doctoral students in a mathematics education programme — a co-operative project between the Centre for the Advancement of Mathematics and Science Education (CASME) and Aalborg University (Denmark).

The workshops themselves were conducted on the basis of three simple 'ground rules':

☐ each participant would share responsibility for the progress of the group;

☐ each participant would provide honest but supportive feedback on the research proposals of colleagues;

☐ each participant would complete a research plan which would be:
  - 'do-able' — i.e., a realistic plan of action;
  - defendable — i.e., could be justified on academic grounds; and
  - fundable — i.e., could attract supporting resources.

The demand for such workshops increased and it was decided to translate the rich workshop presentation and discussions into a user-friendly research manual which could be used in future workshops or by individual graduate students with an interest in developing a research proposal.

Jonathan Jansen ran the workshops and Renuka Vithal was a participant in both workshops. The different experiences and perspectives of the authors have influenced the construction of the manual. The inputs of workshop participants also sharpened the focus of several issues presented in this manual.
ACKNOWLEDGEMENTS

We gratefully acknowledge the invaluable inputs of the following persons on successive drafts of the research manual: Professor Ole Skovsmose of the Royal Danish School of Educational Studies (Copenhagen) and Mr David Brookes, head of the Science Education Development Programme at the University of Durban-Westville (Durban). Special thanks are due to the participants in the workshops that laid the basis for the development of the manual. We thank, in particular, Farida Patel, a participant in the first workshop, for allowing us to use notes taken during the workshop.
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</table>
INTRODUCTION

Some Guidelines for the Effective Use of the Manual

1. This manual offers a practical, application-focused, illustrated guide to writing a research proposal.

2. The manual should not be read as a blueprint for designing research proposals. Research design, like fashion design or curriculum design, is a creative process which reflects the personal tastes and preferences of the designer, cost considerations, time available, audience and the many other factors which shape design decisions. At the same time there are broad guidelines for designing a dress, curriculum or research proposal which most people in that field would agree are basic or essential components of that particular activity.

3. The manual is not a substitute for more intensive theoretical and methodological engagement with the many issues pertinent to research design and proposal writing. It does, however, attempt to provide a simple, clear and coherent strategy for preparing a research proposal without getting lost in the thicket of issues or the specialist language which often intimidates new researchers.

4. The manual could serve various purposes and audiences; it could be used by beginning researchers; research supervisors; research training specialists; or teachers involved in classroom-based research (such as action research). It could be used as a guide to designing a research proposal for funding or a dissertation proposal for university approval, or to focus a piece of independent research.

5. The manual is best used: in a research training context; by a skilled and experienced facilitator; working systematically through the manual; with a group of participants in dialogue on the issues raised in each section of the manual. In this way the manual has more value and meaning to a researcher working in a group context than when it is used by individuals working alone.

6. The manual is designed in such a way that it not only illustrates a set of steps in research design but also generates the kinds of questions which all researchers should ask when evaluating a research proposal.

7. The appendices to this manual provide examples of actual research instruments that demonstrate how different parts of the process come together in exemplary designs.
8. In addition, the manual includes 'work boxes' in each section so that researchers can immediately and progressively complete the details of their proposals as they work through the manual. When these work boxes have been systematically filled in, they collectively provide a first draft outline of the researcher's actual proposal.

9. It must be emphasised that the manual should not be read literally as a linear sequence of neat-and-tidy steps in the research process. There are many points of entry into research. Some disciplines, such as legal scholarship or pharmaceutical research on the effectiveness of different drugs, have particular modes of inquiry and analysis in research. And the research process invariably moves back and forth between problem, method and analysis. For instance, a research problem might only become clearer during the course of the research process, or initial questions might be reformulated in the process of investigation. In this sense, the concept of a 'manual' is problematic in that, while it attempts to makes things clear, it cannot account for the complexity and unpredictability of the research process.

10. Finally, we encourage users of the manual to constantly reflect on ways of adapting the manual for research training in their particular contexts of teaching and learning about research. The manual should be used flexibly and critically. It is not a recipe for doing research but one of many critical tools that help to make sense of the exciting world of research.
Research proposals in education and the social sciences are often organised around the following activities:

1. Selecting a focus
2. Identifying critical questions
3. Stating a rationale
4. Conducting a literature review
5. Locating a theoretical framework
6. Preparing a data collection plan
7. Planning for data analysis strategy
8. Anticipating the report outline
9. Dealing with validity and reliability concerns
10. Acknowledging the limitations of the research

These steps are not sequential in the real world of research. For example, critical questions may be refined following initial research findings, and data collection plans are often modified based on problems anticipated with data analysis. However, being clear about the different tasks in research design facilitates the planning and preparation of a research proposal.
A first step in the research design process could be deciding on a FOCUS for your research. This may take the form of a ‘statement of purpose’.

Examples of ‘statements of purpose’:

The purpose of this study is to explain the poor performance of students in high school mathematics.

The purpose of this study is to investigate the attitudes of student teachers towards the use of corporal punishment in schools.

Now write a sentence which explains your statement of purpose by completing the following sentence, using not more than ten words:

The purpose of this study is to ...

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Consider the following ‘WEAK’ examples of statements of purpose. In each example write down why you think it could be considered to be a poor case.

<table>
<thead>
<tr>
<th>Statement of Purpose</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>... to prove that the science curriculum is racist.</td>
<td></td>
</tr>
<tr>
<td>... to visit mathematics classrooms in Soweto.</td>
<td></td>
</tr>
<tr>
<td>... to investigate problems of three-way misconceptions among black, Catholic, vegetarian females suffering from dyslexia in the Matubatuba district of North Eastern KwaZulu-Natal primary schools, with special reference to geometric configurations in two domains, utilising Volminkian theories of learning as derived from the Reddy-Ziervogal paradox.</td>
<td></td>
</tr>
</tbody>
</table>

See Appendix A. A.1. for possible reasons why these might be considered to be 'poor' statements of purpose for a research design.
Consider the following ‘GOOD’ examples of ‘statements of purpose’. In each example write down why you think it could be considered to be a good case. Also identify the common features in these statements.

<table>
<thead>
<tr>
<th>Statement of Purpose</th>
<th>Reasons</th>
</tr>
</thead>
<tbody>
<tr>
<td>... to assess the impact of the new history curriculum on under-qualified teachers in primary schools.</td>
<td></td>
</tr>
<tr>
<td>... to examine the relationship between mathematics achievement in high school and university among black students.</td>
<td></td>
</tr>
<tr>
<td>... to determine the effects of a process-driven science curriculum on classroom organisation in the junior secondary phase.</td>
<td></td>
</tr>
<tr>
<td>... to explore patterns of gender differentiation in high school mathematics classrooms.</td>
<td></td>
</tr>
<tr>
<td>... to compare the ways in which novice and experienced teachers teach science in under-resourced classrooms.</td>
<td></td>
</tr>
</tbody>
</table>

See Appendix A. A.2. for possible reasons as to why these could be considered to be exemplary statements of purpose for a research design.
Learning Points

1. A broad distinction often made in research is between QUANTITATIVE (e.g. statistical or experimental studies) and QUALITATIVE (e.g. biographical narratives or case studies) research. Which of the five statements in the 'good' examples section would you classify as being more appropriate for quantitative or qualitative research?

2. When key words or phrases such as 'to determine' appear in statements of purpose, they suggest that quantitative research approaches may be more appropriate; whereas 'to explore' or 'to understand' suggest that the study may be qualitative in nature.

3. A statement of purpose for a specific study does more than just impart a research focus: it also hints at the way in which that study may be carried out. e.g. using mainly quantitative or qualitative methods.

4. Note that the statement of focus should be distinguished from the title of the study which may be a 'catchy' phrase or provocative question. The focus statement clearly, precisely and specifically expresses the researcher's purpose.
IDENTIFYING CRITICAL QUESTIONS

Having selected the focus of your research in the previous section, the next step could be to identify **CRITICAL QUESTIONS** which further focus and refine your broad statement of purpose.

Example of critical questions for a given statement of purpose:

- **Statement of Purpose:**
  
  To investigate the use of new science materials by primary school teachers.

- **Critical Questions:**
  
  1. Do teachers use and value the materials?
  2. How are the materials used in different classroom contexts?
  3. Why do teachers use the materials differently in different classroom contexts?

Observe that the following criteria have been taken into account when identifying these critical questions:

- All three questions relate directly to the statement of purpose.
- Each question is linked logically to the other two questions, e.g., you can only answer question 3 if you have already answered 2, etc.
- Each question is linked conceptually to the other questions through the key term(s) which appear in each question. In the example, each question has to do with 'the use of materials' by teachers.
- Each question can stand on its own as a researchable question; each question is also self-explanatory and clear to an outside reader.
Now examine your statement of purpose and write down three critical research questions relevant to the focus of your study:

**Statement of Purpose:**

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**Critical Question 1:**

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**Critical Question 2:**

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**Critical Question 3:**

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Learning Points

1. Of course it is possible to develop any number of critical questions. We propose three questions for the purposes of this manual as a way of retaining a sharp focus on what you, as a researcher, intend to do by remaining focused on a limited number of issues. Our experience in the workshops is that novice researchers often develop long unmanageable lists of questions for research. While such lists may be useful at an exploratory stage, they need to be reduced in a realistic research plan. You may find that the questions may merge, fall away or expand when you begin to develop your data collection strategies, and you may end up with more or fewer than three questions.

2. As with the statement of purpose, keep the questions simple and concise in order to stay focused.

3. When formulating the critical questions, ensure that they relate directly and exclusively to what has been outlined in the statement of purpose.
STATING A RATIONALE

A RATIONALE usually serves as a succinct statement of:

☐ how the researcher came to develop an interest in the proposed topic; and

☐ why the researcher believes the proposed research is worth doing.

Below is an example of a rationale developed by an educational researcher working with second-language English students:

Since starting as an English teacher two years ago, I have noticed that L2 (second language) learners display a distinct difference in their ability to speak English (which they do well) and write in English (which they do poorly). I decided to investigate the possible reasons for this disjunction between spoken and written English among L2 speakers. The findings from this research could be useful to:

☐ teachers of L2 learners with an interest in improving writing skills of students,

☐ curriculum development specialists and textbook writers who prepare English material for L2 classrooms, and

☐ national and regional policymakers who design language policies for L2 schools and classrooms.

Observe that the researcher explains how she became interested in the topic in terms of personal experiences based on a puzzle or paradox. Other ways in which researchers develop an interest in a research topic include:

☐ a gap or silence in the literature;

☐ an untested theory;

☐ involvement in collective, funded research; and

☐ dissatisfaction with an existing practice or belief.
Note that in the above example the justification for the research (that is, why the research is worth doing) is framed in terms of:

☐ teachers;

☐ curriculum or material development specialists; and

☐ policymakers.

Now write a rationale for your research:
Learning Points

1. The rationale should be brief and to the point. Avoid long background descriptions which are not immediately relevant to the research question(s).

2. The rationale can be written in the first person singular. In our view, this allows for greater personal engagement with the topic than does a distant, impersonal writing style which often impedes authentic descriptions of the research. However, different journals, institutions and research supervisors may have their own expectations on this issue.

3. The significance of any study is usually articulated in terms of its contribution to improving practice, informing policy or enriching the knowledge base on the topic or issue being investigated.
A LITERATURE REVIEW offers a synthesis of:

☐ what has already been written on the topic;

☐ what has not been written on that topic, or is written in such a way that it is conceptually or methodologically inadequate, with the goal of clarifying

☐ how the researcher’s proposal addresses the ‘gap’, silence or weakness in the existing knowledge base.

Here is an example of a brief excerpt from a literature review on the topic of effective schools.

The existing research on effective schools has been based on:
1. ‘input-output’ models applied to
2. large survey studies (50 or more schools)
3. American and British schools.

The literature is therefore limited in that it fails to:
1. pinpoint the in-school processes or transactions which make schools effective or ineffective, or
2. offer in-depth descriptions of a few schools, or
3. explain school effectiveness in developing countries.

My research will therefore provide detailed case studies of five effective schools in southern Africa with a focus on the processes or interactions within schools and classrooms which explain ‘effectiveness’.

Observe that the researcher uses three limitations in the existing literature on effective schools to justify her research focus:

1. a methodological limitation — using large survey studies;
2. a contextual limitation — applied only in British and American schools;
3. a conceptual limitation — using input-output studies.

What are some other kinds of limitations which could be uncovered by a literature review?
Observe that the review selects a particular point of entry into the literature. In the above example, the researcher selects as her point of entry the Anglo-American literature on effective schools. What are other possible 'points of entry' for a literature review on the same topic?

Now briefly outline a possible literature review for your study, identifying the point of entry:

**Literature Review for the Study:**

...
Learning Points

1. A literature review is an informed assessment of the existing research on the topic under study.

2. It demonstrates that the researcher has read extensively and intensively on the topic. This is indispensable for the credibility of a well-written, informed literature review.

3. A literature review is a critical synthesis of the existing research, not an open-ended, long-winded description of 'who said what'.

4. A literature review is goal-focused. The goal is to identify limitations in the existing research on a subject in order to justify the proposed research.

5. In preparing for a literature review, progressively narrow down your reading of the literature as close as possible to the topic.
LOCATING A THEORETICAL FRAMEWORK

A THEORY or THEORETICAL FRAMEWORK could be described as a well-developed, coherent explanation for an event e.g., Piaget's theory of child development.

Researchers may specify a theoretical framework for the following reasons:

- to locate their research, i.e., to signal where the research is coming from;
- to test a theory, i.e., to assess the validity of a theory's propositions in the study being undertaken, or to compare the explanatory power of two rival theories;
- to apply a theory, i.e., to use a theory's propositions in the design and conduct of the study.

Here is an example of an excerpt from a theoretical framework:

This research is informed by Piaget's theory of development which holds that children progress through discrete stages of intellectual development. While working within the Piagetian framework, this research will also explore the validity of this developmental theory in developing-country contexts, and using intellectual tasks different from those originally assigned when the theory was developed.

Does the above example test, apply or merely 'locate' the proposed research within established theory?

What is the difference between a theoretical framework and a typical literature review?
Designing Your First Research Proposal

Briefly describe a theoretical framework which may apply in your study, and explain how it will be used in your research:

Theoretical Framework:

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Learning Points

1. A theory is selected for its power and elegance in explaining an educational or social event, e.g., why children fail. It is not used for ornamental purposes in a study.

2. A theory is also a perspective on events, and always exists in the context of competing or rival theories.

3. A 'conceptual framework' can be distinguished from a theoretical framework in that it is a less well-developed explanation for events. For example, it might link two or three key concepts or principles without being developed into a full-blown theory.

4. Not all studies require explicit theoretical frameworks. For example, they may not be needed in explorations of new areas of research where well-developed theories may not exist. However, considering the 'conceptual' or 'theoretical' framework in a study assists in making visible assumptions built into the research.

5. To write a theoretical framework usually assumes familiarity with new and established theories in the proposed area of research.

6. Note that a literature review can sometimes review key concepts within a field of study in such a way that the review constitutes the conceptual framework for the study. Similarly a theoretical framework could emerge from a literature review of relevant theories on a given subject.

7. It is possible for a study to have, as its main focus, the development of a particular theory or theoretical framework.

NOTES:
A **DATA COLLECTION PLAN** sets out in detail a strategy for collecting data. Typically, the description of a data collection plan includes the following elements:

- the *general methodological orientation*;
- the *research parameters* within which the data will be collected; and
- the *research instruments*.

1. The data collection plan is often preceded by a statement about the *general methodological strategy*.

Some examples are:

   **This research is a case study** of racial integration at a historically white college of education.

   **This research represents an analysis of biographical profiles** of novice science researchers.

Now try to formulate a similar statement about the methodological orientation for your research:

   **This research:**

2. A second step is for the researcher to develop a detailed data collection plan which sets out the *parameters* for each of the critical questions identified earlier. By 'parameters' we mean decisions about what data to collect, from whom, how often, etc.
3. Before defining the parameters, it is important to recognise the multiplicity of sources for data collection.

Consider the following sources of data which could be used in research to address a particular research question:

<table>
<thead>
<tr>
<th>surveys</th>
<th>documents</th>
<th>records</th>
<th>adverts</th>
</tr>
</thead>
<tbody>
<tr>
<td>photographs</td>
<td>journals</td>
<td>interviews</td>
<td>census data</td>
</tr>
<tr>
<td>oral history</td>
<td>questionnaires</td>
<td>cases</td>
<td>buildings</td>
</tr>
<tr>
<td>surveys</td>
<td>audio tapes</td>
<td>body language</td>
<td>drawings</td>
</tr>
<tr>
<td>garbage</td>
<td>music</td>
<td>tests</td>
<td>posters</td>
</tr>
<tr>
<td>biographies</td>
<td>stamps</td>
<td>letters</td>
<td>excavations</td>
</tr>
<tr>
<td>written work</td>
<td>videos</td>
<td>furniture</td>
<td>statistics</td>
</tr>
<tr>
<td>observations</td>
<td>dialogue</td>
<td>conferences</td>
<td>critical incidents</td>
</tr>
<tr>
<td>accidents</td>
<td>articles in news media</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Add some others:

<table>
<thead>
<tr>
<th>Sources of Data:</th>
<th></th>
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<tr>
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</tr>
</tbody>
</table>
Here is an example of a strategy for data collection:

<table>
<thead>
<tr>
<th>Critical Question: How do teachers use the new science textbook?</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Questions for developing a data collection plan</th>
<th>A data collection plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHY Is the data being collected?</td>
<td>to determine how teachers intend to use the textbook (i.e., before) and how they actually use the textbook in the science classroom (i.e., after)</td>
</tr>
<tr>
<td>WHAT Is the research strategy?</td>
<td>interviews will be conducted to collect the required data</td>
</tr>
<tr>
<td>WHO (or what) will be the sources of the data?</td>
<td>science teachers will be interviewed</td>
</tr>
<tr>
<td>HOW MANY of the data sources will be accessed?</td>
<td>six science teachers will be interviewed, two from each of three schools</td>
</tr>
<tr>
<td>WHERE is the data to be collected?</td>
<td>the six science teachers will be interviewed at three primary schools in Umbumbulu</td>
</tr>
<tr>
<td>HOW OFTEN will data be collected?</td>
<td>the teachers will be interviewed once before a lesson (to collect data about teacher intention) and once after their lesson (to collect data about actual usage)</td>
</tr>
<tr>
<td>HOW will the data be collected?</td>
<td>data will be collected through semi-structured interviews which will be tape-recorded</td>
</tr>
<tr>
<td>JUSTIFY this plan for data collection. (Why is this the best way of collecting data for this critical question?)</td>
<td>The interviews will provide the most direct evidence of teacher intentions and usage of the textbook. They will be semi-structured to allow the researcher to probe initial responses. The six teachers at the three schools represent all teachers who have agreed to participate in the research.</td>
</tr>
</tbody>
</table>
Now, using the guidelines set out above, state the parameters for each of your critical questions. Complete the following for one of the critical questions you have identified:

Critical Question: .................................................................

<table>
<thead>
<tr>
<th>Questions</th>
<th>Your data collection plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHY is the data being collected?</td>
<td></td>
</tr>
<tr>
<td>WHAT is the research strategy?</td>
<td></td>
</tr>
<tr>
<td>WHO (or what) will be the sources of the data?</td>
<td></td>
</tr>
<tr>
<td>HOW MANY of the data sources will be accessed?</td>
<td></td>
</tr>
<tr>
<td>WHERE is the data to be collected?</td>
<td></td>
</tr>
<tr>
<td>HOW OFTEN will data be collected?</td>
<td></td>
</tr>
<tr>
<td>HOW will the data be collected?</td>
<td></td>
</tr>
<tr>
<td>JUSTIFY this plan for data collection.</td>
<td></td>
</tr>
</tbody>
</table>
3. The next step in the data collection plan is to design the research instruments.

Consider the research instrument in the given example which required the development of an interview schedule to be used by a researcher to interview the teachers after they had used the textbook in class.

Example of a semi-structured interview schedule:

![Interview Schedule]

Critical Question: How do teachers use the science textbook?

☐ How did you plan to introduce the new textbook to the children?

☐ What adjustments, if any, did you make to your original plans for using the textbook once you started teaching?

☐ Did the textbook help you cover the key science concepts in the syllabus topic?

☐ In what way(s) did the textbook
a) help your teaching
b) hinder your teaching?

☐ How did your pupils respond to the textbook?
   Checklist: enjoyment; boredom; confusion; understanding; excitement; participation

☐ Do you think that this textbook can help children to learn? What did they learn?

☐ Have you learnt anything new by using the textbook with your class?

See Appendix B for examples of other types of research instruments, such as

☐ observation schedules;

☐ profiles;

☐ interview schedules; and

☐ questionnaires.
Now develop a draft design of a research instrument for one of your critical questions:

**Critical Question:**

**Research Instrument:**
Learning Points

1. Be creative and innovative when planning data collection.

2. Any data collection procedure will have advantages and limitations.

3. It is important to be able to justify your choice of research strategy.

4. Maintain a close link between the critical questions and the research strategy.

5. Different research questions often require different choices of instruments.

6. Developing an appropriate research strategy requires more than simply a 'method' in a narrow, instrumentalist sense.

7. Research instruments may be
   - developed from scratch;
   - existing instruments; or
   - modified from existing instruments.

8. Instruments, e.g. questionnaires, are often piloted to check for clarity and meaningfulness of questions, for instance, by setting up a reference group which includes researchers from different disciplinary or research backgrounds.

9. More than one strategy/source may be used in collecting data for a particular research question. Data from a variety of sources/instruments, such as a combination of interviews and classroom observations, assist in providing the necessary checks and balances in the research (see the section on validity). Also, an initial questionnaire, for example, can provide information on a topic and act as a screening process to select subjects for in-depth interviews.

10. There is a range of ethical and political issues in data collection which must be considered. These include: confidentiality of the persons interviewed or documents reviewed; reporting on sensitive or controversial issues; ownership of the data generated through research; power relationships between researcher and researched; consent of subjects; etc.

NOTES:
Having collected the data from the field, the purpose of **DATA ANALYSIS** is to make sense of the accumulated information.

Data analysis includes at least three steps:

- Scanning and cleaning the data
- Organising the data
- Re-presenting the data

1. **Scanning and cleaning the data** requires the researcher to prepare the raw data for analysis by:
   - reading the data;
   - checking for incomplete, inaccurate, inconsistent or irrelevant data;
   - identifying preliminary trends in the scanned data to facilitate the organisation of the data into meaningful 'chunks'.

2. **Organising the data** allows the researcher to make sense of the information by arranging it in a manageable form. This may require the researcher to:
   - count: e.g., how many teachers 'strongly agreed' on a limited-choice, 5-point item in a questionnaire;
   - describe: e.g., descriptions which provide in-depth analytic (as opposed to journalistic) descriptive narratives about a sequence of events — for instance describing how teachers interact with learners in project work;
   - compare: e.g., responses from different students on a test item;
   - categorise: e.g., by identifying patterns of responses on a question or embedded themes; through the use of descriptive statistics (e.g., averages and means); or through the use of inferential statistics (e.g., regression analysis).
3. **Representing the data** in different ways often provides meaningful summaries of large amounts of data. This can take several forms:

- tables, e.g. cross-tabulations;
- graphs, e.g. pie charts (which show relationships of parts to the whole); histograms (which show comparisons between categories); line graphs (which emphasise time and rate of change); and scatter graphs (which demonstrate trends and patterns);
- statistical summaries, e.g. means; standard deviations; correlations; and results of other statistical procedures;
- selected quotations, e.g. powerful, representative or illustrative direct statements from responses to a question in an interview; and
- case boxes, an example of which appears below:

---

### Primary Science Teaching

**School A:** This is a top primary school in Inanda. A qualified teacher is conducting a lesson on measurement. The class of 37 is organised in groups of five or six students in a classroom filled with mathematics and science equipment: charts; apparatus; a hamster and a fish tank. The teacher is the authority. The children chorus the answers. Discipline is maintained throughout the lesson. Strong rote teaching is evident. The lesson is conventional and well managed, with the students performing various practical tasks: measuring tables; using tape measures; and filling in answers in workbooks. I am left with the feeling that with resources like that, much more could be accomplished.

**School B:** This is a well-managed school in Umlazi. The 40 students are crowded around two tables. The lesson on volume is conducted by demonstration, despite the fact that there is ample apparatus in the cupboards. The qualified teacher is lively and enthusiastic. Responses are elicited from individual students during the lesson. Resources are not the issue here, classroom management is.

---

Learning Points

1. The actual steps taken in a data analysis strategy may differ according to the type of data and the nature of the research, i.e., qualitative or quantitative.

2. Data collection and data analysis is an iterative process, i.e., the researcher moves repeatedly back and forth through the data (collecting-analysing-collecting-analysing data) rather than in a simple, linear direction.

3. Most data analysis procedures, especially in larger studies, utilise computer-based software programs, whether such studies are qualitative (e.g. Ethnograph) or quantitative (e.g. SPSS) in nature.

Discuss a plan for analysing the data collected in your study:

Plan for Data Analysis in the Study:
A **REPORT OUTLINE** suggests the way in which the research report or dissertation will be divided into chapters or sections. It is a preliminary document.

Here is an example of a conventional report outline:

<table>
<thead>
<tr>
<th>TITLE (provisional)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Purpose of Study</td>
</tr>
<tr>
<td>2. Critical Questions</td>
</tr>
<tr>
<td>3. Rationale</td>
</tr>
<tr>
<td>4. Literature Review</td>
</tr>
<tr>
<td>5. Theoretical (or Conceptual) Framework</td>
</tr>
<tr>
<td>6. Methodology</td>
</tr>
<tr>
<td>7. Critical Question 1</td>
</tr>
<tr>
<td>7.1 restatement of the critical question</td>
</tr>
<tr>
<td>7.2 summarising the data collection and analysis for this critical question</td>
</tr>
<tr>
<td>7.3 specifying and discussing the research findings related to this critical question</td>
</tr>
<tr>
<td>8. Critical Question 2 (and so on)</td>
</tr>
<tr>
<td>9. Discussion of Overall Research Findings</td>
</tr>
<tr>
<td>9.1 the general research findings</td>
</tr>
<tr>
<td>9.2 the implications of the research findings</td>
</tr>
<tr>
<td>9.3 the limitations of the research</td>
</tr>
<tr>
<td>10. Bibliography</td>
</tr>
<tr>
<td>11. Appendices, e.g. instrumentation, other documents</td>
</tr>
</tbody>
</table>
Learning Points

1. There are many creative ways to organise the research report; the illustrative example is one conventional way of planning and writing a dissertation which captures the main components of a research report.

2. The illustration assumes that the researcher has two critical questions: you may have more or less.

3. The report outline at this stage is a preliminary and tentative sketch of what the final report could look like. In reality, the report may look very different after two to five years of research. However, such an initial outline is a useful planning tool for the researcher and an important way of communicating the research plan to an external audience, such as a dissertation committee.

Now write out your provisional report outline, but write in the actual title and critical questions in the relevant chapter headings. Feel free to transform the critical question into a different ‘chapter heading’ statement.
DEALING WITH VALIDITY AND RELIABILITY CONCERNS

Validity

How does a researcher know that s/he knows something?

Validity is an attempt to 'check out' whether the meaning and interpretation of an event is sound or whether a particular measure is an accurate reflection of what you intend to find out.

Consider, for example, the following event, adapted from an example used by the anthropologist Clifford Geertz:

There are several people in a room. Rajesh enters the room and winks in the direction of Lindiwe.

Possible interpretations of this event may include:
- Rajesh is greeting Lindiwe
- Rajesh is making a pass/flirting with Lindiwe
- Rajesh is communicating some message to Lindiwe
- Rajesh has an eye irritation

How will the observer (researcher) know what the winking of the eye actually means?

The data about this event may be collected by:
(a) — interviewing Rajesh
    — interviewing Lindiwe
    — interviewing some/all the other people in the room

and
(b) comparing the meanings articulated by the different respondents
There are a number of ways in which a researcher may check for validity:

1. Comparing findings of one instrument with findings from other instruments;
2. Conducting joint observations or collaborative marking of the same tests;
3. Returning draft reports to respondents for accuracy checks;
4. Considering rival explanations for the same issue or question;
5. Doing multiple observations of the same event.

**Reliability**

Reliability is about the consistency of a measure, score or rating.

Consider two examples:

Two observers rate the same event, e.g., children’s responses in a classroom to teacher threats. In a perfect world, the two observers would provide exactly the same rating or score for the same children observed. That is, reliability is perfect.

Students write a biology test on Monday and a biology retest (the same test) on Friday. In a perfect world (e.g., assuming no ‘practice effect’) the score of the students on Monday and Friday should be exactly the same.

Since the world of research with human subjects is not perfect, researchers developed a number of techniques for estimating reliability, i.e., the degree of ‘error’ in measurement. One such technique is called the reliability coefficient, a measure which ranges from $r = 0$ to $r = 1$ (perfect reliability). The higher the correlation coefficient (i.e., the closer to 1), the higher the reliability of the measure and the lower the ‘error’ of measurement.
Learning Points

1. Reliability is used more often in statistical studies and less frequently in qualitative studies where other standards of validation and consistency are typically sought.

2. Reliability and validity are understood, explained and dealt with in different ways in qualitative and quantitative research.

Describe how you will deal with validity and/or reliability issues in your research:
ACKNOWLEDGING THE LIMITATIONS OF THE RESEARCH

ACKNOWLEDGING LIMITATIONS empowers the reader to appreciate what constraints were imposed on the study, and to understand the context in which the research claims are set.

Here is an example:

This research on ten effective schools worked within four important limitations. First, access to schools was limited to two weeks per term by the education department. Second, three of the schools changed principals during the course of the study — with some impact on the subsequent performance of the school. Third, four of the schools could not find performance data for the preceding seven-year period. And fourth, one of the 'control' schools withdrew from the study at a late stage in the research process. The research design was adjusted accordingly, as set out in the methodology section.

Learning Points

1. All studies work within limitations, e.g., access, time, resources, availability and credibility of secondary data, such as departmental statistics on schools.

2. The researcher must, as far as possible, indicate how she accommodated these limitations in the study, i.e., specify what trade-offs were made in the study, given the identified constraints.

3. Note that some constraints are more serious than others, and may require radical decisions (e.g., change the focus of the research) or substantial adjustments in the research design.

Name some ways in which the researcher could 'adjust' the research design in the above example.
Outline the constraints which you anticipate in your research and indicate how you would go about addressing such constraints in your study:

Limitations of the Study:

_________________________________________________________________________________

_________________________________________________________________________________

_________________________________________________________________________________

_________________________________________________________________________________

_________________________________________________________________________________

_________________________________________________________________________________

_________________________________________________________________________________
Research can be both a frustrating and exhilarating process. The following lessons learnt from the field are provided for the encouragement of new researchers.

1. The only way to do research is to do it.
2. Successful researchers make time.
3. Researchers never arrive – the best research is ‘work in progress’.
4. Good researchers take risks.
5. The cloistered researcher is a myth; the best researchers depend on a community of collegial support.
6. Research problems are sought or constructed; they are seldom stumbled upon.
7. The final product is totally deceptive; many messes, misses and moanings precede it.
8. There will always be more interesting topics than a single study will permit, so stay focused!
9. There will always be an ‘expert’ who thinks your research is a joke or irrelevant.
10. The best research answers simple questions.
BRIEF READING LIST


APPENDIX A

A.1 Reasons for ‘poor’ statements of purpose

1. The statement of purpose should not anticipate the outcome(s) of the research.

2. Phrases such as ‘to visit’ are vague and do not imply a rigorous and systematic process of inquiry. They provide no indication of ‘how’ or ‘what’ the researcher will be focusing on in the study.

3. Statements indicating the focus of the study must be written clearly and concisely and separated from the specific critical research questions and other detailed descriptions of the subjects and methodology.

A.2 Reasons for ‘good’ statements of purpose

In the given statements of purpose the following aspects are common features:

1. The intention of the researcher is explicitly stated — to assess; to examine; to explore; to determine or to compare. That is, the focus statement points toward ‘how’ the study will be undertaken — a likely research methodological orientation is hinted at.

2. The ‘object(s)’ of the study is (are) identified — the new history curriculum; mathematics achievement; gender differentiation; effect of a curriculum on classroom organisation; or how science is taught. Exactly ‘what’ the researcher will be focusing on is clarified.

3. The participants or subjects in the study are described — underqualified teachers; black students; people involved in the junior secondary phase; or novice and experienced teachers. ‘Who’ will be involved in the study is indicated in each statement.

4. The context(s) in which the study is located is (are) included or implied in the statement of purpose — primary schools; high school science classrooms; under-resourced classrooms; university and high school; or the junior secondary phase. The focus includes a reference to the question of ‘where’, or ‘the sites’ of the study are likely to be.
5. Although the statement of purpose should be as succinct as possible, it should also convey sufficient information to allow the reader to immediately understand what the research is about.
Examples of different types of research instruments follow.

B.1 Observation Schedule (using categories)
   B.1.1 Observation of Teaching
   B.1.2 Observation of Learning

B.2 Observation Record (using narrative)

B.3 School Resource Profile

B.4 Classroom Environment and Resources Checklist

B.5 Interview Schedule

B.6 Questionnaire
## B.1 Observation Schedule (using categories)

### B.1.1 Observation of Teaching

**CHANGES IN TEACHING**

<table>
<thead>
<tr>
<th>Indicator:</th>
<th>Effective teachers use multiple teaching strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical Question:</td>
<td>Do teachers use multiple teaching strategies?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
</tr>
<tr>
<td>lecture</td>
<td></td>
</tr>
<tr>
<td>role play</td>
<td></td>
</tr>
<tr>
<td>independent desk work</td>
<td></td>
</tr>
<tr>
<td>demonstration</td>
<td></td>
</tr>
<tr>
<td>multi-media presentation</td>
<td></td>
</tr>
<tr>
<td>other</td>
<td></td>
</tr>
</tbody>
</table>

**Elaboration** (record any relevant information; clarification, puzzles, elaborations)

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---

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### B.1.2 Observation of Learning

**CHANGES IN TEACHING**

**Indicator:** In effective classrooms students participate actively in the lessons

**Critical Question:** Are students actively engaged in the lesson?

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>students ask questions</td>
<td></td>
</tr>
<tr>
<td>students listen attentively</td>
<td></td>
</tr>
<tr>
<td>students are involved in the set tasks</td>
<td></td>
</tr>
</tbody>
</table>

**Coding**

1 = not at all  
2 = some of the time  
3 = all the time  

**Elaboration** *(include other relevant criteria)*

...
B.2 Observation Record (using narrative)

NARRATIVE SCHEDULE

Example

<table>
<thead>
<tr>
<th>Class:</th>
<th>Std 5 Science</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher:</td>
<td>Mrs Nxumalo (coded)</td>
</tr>
<tr>
<td>School:</td>
<td>Sunset Primary</td>
</tr>
<tr>
<td>Lesson:</td>
<td>Acids and Bases</td>
</tr>
<tr>
<td>Date:</td>
<td>12 July 1995</td>
</tr>
</tbody>
</table>

Narrative

The teacher started the lesson about five minutes late; apparently she was delayed in the principal's office. She took about another ten minutes with routine administrative tasks which included the collection of homework, announcing the test date and the relevant pages to study. She constantly interrupted an announcement with appeals to students to remain quiet, return to seats and take out their books.

After 15 minutes the lesson started. Ms Nxumalo wrote a definition for Acids on the board, which she copied from the textbook she was holding. Students were asked to repeat the definition in chorus ... three times. She then called on individual students to repeat the definition by reading it off the board. She erased the definition and asked students to recall the definition. Few students could repeat the definition word for word; students laughed loudly when a fellow student struggled to get the wording right. The teacher then repeated the definition — by reading it from the textbook. This activity took about 20 minutes.

She then told the students to read quietly from the section on 'Acids and Bases' in the textbook. I noticed about four or five students sharing one textbook. I also noticed that several textbooks were in a poor state, with pages missing, covers torn and pen writing across the pages. About two minutes into this exercise, the bell rang. Students rushed towards the door. The teacher walked over to me and confided: 'This is my worst class.'

Reflections

Much time was wasted in administrative and disciplinary tasks. Teacher appeared confident but authoritarian. No questions exchanged. Students were simply instructed to repeat a definition by rote. The lesson was poorly organised. Teacher-centred lesson; lecture dominated. No visible support or display materials in the classroom related to science or to the topic for the day. No clear patterns were discernible with regard to race, gender or class discrimination.
Learning Points

1. This is an abbreviated narrative for purposes of illustration only. You may have a longer narrative.

2. You need not record everything that happens in the classroom – only the main sequence of events during the period.

3. We would encourage the occasional use of direct, selected quotations of teacher/student talk, especially if they add powerfully to the broad focal questions of interest in the classroom observations.
B.3 School Resource Profile

1. What is the general condition of your school buildings?
   1.1 the school needs complete rebuilding
   1.2 some classrooms need major repairs
   1.3 most or all classrooms need minor repairs
   1.4 some classrooms need minor repairs
   1.5 in good condition

2. Which of the following does your school have, and in what condition?

   |   |   |   |   |
---|---|---|---|---|
2.1 | school library |   |   |   |
2.2 | school hall   |   |   |   |
2.3 | store room    |   |   |   |
2.4 | staff room    |   |   |   |
2.5 | sports field  |   |   |   |
2.6 | separate office for principal |   |   |   |
2.7 | separate office for school secretary |   |   |   |
2.8 | telephone     |   |   |   |
2.9 | fax machine   |   |   |   |
2.10 | typewriter    |   |   |   |
2.11 | photocopier   |   |   |   |
2.12 | computer      |   |   |   |
2.13 | film projector|   |   |   |
2.14 | radio         |   |   |   |
2.15 | electricity   |   |   |   |
2.16 | piped water   |   |   |   |
2.17 | science laboratory |   |   |   |
Appendix B

3. Which of the following are found in the classrooms of your school?

<table>
<thead>
<tr>
<th></th>
<th>All</th>
<th>Most</th>
<th>Some</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>a usable chalkboard</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>chalk</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a cupboard</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a teacher table</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a teacher chair</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a wall chart of any kind</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>student desks</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>other...</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. Which statement most accurately depicts the general availability of textbooks in your school? The approximate percentage of students who have all the required textbooks in all school subjects is:

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>about 90-100</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>about 75-89</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>about 50-74</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>about 25-49</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>about 0-24</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
B.4 Classroom Environment and Resources Checklist

School Name .................................................. School Type (e.g. farm; primary) ..............
School Size (number of pupils) ....................... Teacher's Name ........................................

CLASSROOM ENVIRONMENT
Tick 'Yes' or 'No'. Please give details where necessary.

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Adequate desks for all students
2. Table for teacher
3. Noise from outside is distracting
4. Lighting is adequate
5. Adequate space for movement around classroom
6. Classroom is cheerful and inviting
7. Ventilation/temperature is comfortable

Comment ......................................................................

RESOURCES CHECKLIST

V = Visible in classroom but not used. U = Used this period. N = Not visible.
Please indicate by putting a circle around the relevant letter. If not sure, check with the teacher.

<table>
<thead>
<tr>
<th>V</th>
<th>U</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Comic books
2. Comic workbooks
3. Textbooks
4. Exercise books
5. Overhead projector
6. Audio tapes
7. Audio tape player
8. Wallcharts
9. Television and video player
10. Power points
11. Chalkboard and chalk
12. Others (pens; scissors; paper)

Comment ......................................................................
B.5 Interview Schedule

SCHEDULE FOR FOLLOW-UP INTERVIEW WITH TEACHER
AFTER S/HE HAS USED THE MATERIAL IN CLASS

Do teachers use and value the material?
1. How did you feel introducing this new material to the children?
2. Did the comic help you cover the key science concepts in the syllabus topic?
3. What can you say about your pupils' response to the comic?
   Checklist: enjoyment, excitement, boredom, understanding, confusion, participation
4. Do you think that this comic can help children learn? What did they learn? How did they learn it?
5. Have you learnt anything new from using the comic with your class?

How are the materials used in different contexts?
6. Did you have all the comics that you needed?
7. Do you feel that you used the comic in the way that you intended?
8. What preparation did you have to do?
9. In what ways can the comic help teachers to improve their teaching?

What support do teachers need to use the materials?
10. Did the training with the comic give you new ideas about teaching and the use of new materials?
11. Do you need any further support to use the material? If so, what support do you need?
B.6 Questionnaire

**EVALUATION PRACTICE (EP) READER SURVEY**

1. Currently, content for EP is divided among the sections listed in a–j below. How important is each of those sections? Please circle the numeral that best reflects your response, using the scale below. Then, please check how you most typically approach each of these sections. (We recognise that this will vary with topic, etc., but we are after your typical use of each section.)

<table>
<thead>
<tr>
<th>Section Description</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Articles</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Forum (essays, opinions, and professional judgements addressing the philosophical and ethical dilemmas of the evaluation professions)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. In Response (concise comments from readers regarding articles previously published in EP)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Interviews and Panel Discussions (discussions with important stakeholders or those with views of general interest to evaluators)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. Book Reviews</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f. Traces (excerpts from previously published articles, books, or speeches which influenced the profession)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>g. Tools, Products, and Services (new items—or old items used in new ways—that might interest practising evaluators)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>h. Recent Evaluations (lists of reviews of recently published articles or reports of actual evaluations)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i. Letters to the Editor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>j. 'News' (enclosed with each EP mailing)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
At last there is a practical guide for any student embarking on a research project. Whether you are considering an undergraduate research project or a PhD thesis, *Designing Your First Research Proposal* is an essential tool for finding your way in the exciting and often confusing world of research.

This manual is:
- a practical, application-focused guide;
- appropriate across disciplines, including law, education, nursing, science, social work, music and mathematics;
- suitable for all levels of research; and
- interactively structured, allowing for self-directed research training.

After having worked through the manual the reader will have a sound proposal and many practical skills needed for a successful research project.

**ABOUT THE AUTHORS:**

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