

## CHAPTER 4

### RESEARCH METHODOLOGY

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## 4.1 Introduction

In Chapters 2 and 3 the factors possibly influencing Grade 12 results were explored. Variables related to these results were identified and discussed.

This chapter focuses on the research design employed for investigating factors which possibly influence Grade 12 results. These factors were proposed on the basis of the literature (Chapters 2 and 3) and are:

**Table 4.1: Factors which possibly influence Grade 12 results**

1	<i>SOCIAL AND HISTORICAL FACTORS</i>
	Language and culture
	Venda history
	The effect of apartheid
2	<i>SCHOOL FACTORS</i>
	Locality
	School culture
	Funding
3	<i>TEACHER FACTORS</i>
	Training
	Classroom management
	Motivation
4	<i>LEARNER FACTORS</i>
	Intelligence and/or verbal skills
	Language
	Motivation
	Background culture
	Gender
	Parental involvement
	Home environment
	Foundation
	Expectations

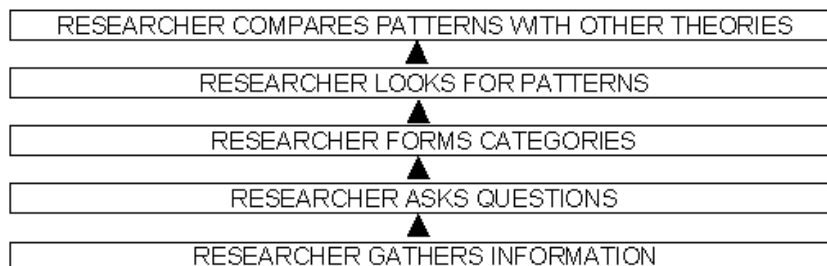
	Self-assessment
	Participation
	Study skills
	Time management

## 4.2 Aims of the Investigation

The primary aim of the investigation was to determine which of the identified possible factors actually do have an effect on Grade 12 results in the study area – defined geographically in section 4.5. – and also the nature and magnitude of this effect.

A second aim of this study was to develop a questionnaire that could assess these variables by eliciting the opinions and experiences of teachers.

A third aim of the study was to test which of the variables could be considered to be dependent on each other, and which were independent, by means of contingency tables utilizing the results obtained from the questionnaires. Pairs of variables were accordingly tested without reference to the Grade 12 results obtained by the sample schools. In this way the hypotheses could be better specified and interpretation better grounded. A number of variables were found to be unrelated, in other words, procedures very much followed those recommended by Cresswell (1994).



**Figure 4.1: Hypothesis formation**

## 4.3 Hypotheses

A total of 18 hypotheses emerged for testing, as follows:

#### 4.3.1 Teacher factors

(Hypotheses based on each factor appear below given factors)

The following three teacher factors were identified:

*Highest academic qualification of teachers (Variable 4)*

**H<sub>01</sub>** The Grade 12 results in a school are independent of the academic level of Grade 12 teachers.

*Highest teaching qualification of teachers (Variable 5)*

**H<sub>02</sub>** The Grade 12 results in a school are independent of the level of teaching qualification of Grade 12 teachers

*Teachers' home language (Variable 7)*

**H<sub>03</sub>** The Grade 12 results in a school are independent of the home language of Grade 12 teachers.

#### 4.3.2 School factors

The following ten school factors were identified:

*Locality of school, rural/urban (Variable 8)*

**H<sub>04</sub>** The Grade 12 results in a school are independent of the situation of the school in terms of urban and rural.

*Number of classrooms (Variable 10)*

**H<sub>05</sub>** The Grade 12 results in a school are independent of the sufficiency of classrooms in the school.

*Assembly hall (Variable 12)*

**H<sub>06</sub>** The Grade 12 results in a school are independent of the presence of an assembly hall in the school.

*Administration block (Variable 15)*

**H<sub>07</sub>** The Grade 12 results in a school are independent of the presence of an administration block in the school.

*Stationery supply (Variable 16)*

**H<sub>08</sub>** The Grade 12 results in a school are independent of the adequate provision of stationery in the school.

*Library (Variable 17)*

**H<sub>09</sub>** The Grade 12 results in a school are independent of the presence of a library in the school.

*Library bookstock (Variable 19)*

**H<sub>010</sub>** The Grade 12 results in a school are independent of the presence of a good number of books in the school library.

*Library service (Variable 21)*

**H<sub>011</sub>** The Grade 12 results in a school are independent of the presence of adequate service in the school library.

*Audio-visual aids (Variable 22)*

**H<sub>012</sub>** The Grade 12 results in a school are independent of the adequacy of audio-visual aids in the school.

*Teacher-generated problems (Variable 29)*

**H<sub>013</sub>** The Grade 12 results in a school are independent of the seriousness of teacher-generated problems in the school.

### **4.3.3 Parental involvement**

The following one parental involvement factor was identified:

*Meetings with parents (Variable 31)*

**H<sub>014</sub>** The Grade 12 results in a school are independent of the frequency of meetings with parents in the school.

#### 4.3.4 Teacher motivation and management

The following two teacher motivation and management factors were identified:

*Staff meetings (Variable 44)*

**H<sub>015</sub>** The Grade 12 results in a school are independent of the frequency of staff meetings in the school.

*Scheduling of staff meetings (Variable 45)*

**H<sub>016</sub>** The Grade 12 results in a school are independent of the scheduling of staff meetings in the school.

#### 4.3.5 Learner motivation and management

The following two learner motivation and management factors were identified:

*Learner motivational levels (Variable 54)*

**H<sub>017</sub>** The Grade 12 results in a school are independent of the level of learner motivation in the school.

*Performance with notes and summaries (Variable 56)*

**H<sub>018</sub>** The Grade 12 results in a school are independent of the level of learner performance in making notes and summaries in the school.

#### 4.4 The Measurement of Variables

The variables used for the purposes of this survey were the following:

##### **Dependent variables**

The dependent variables in this study are the Grade 12 results of the two different types of schools.

### **Independent variables**

The independent variables in this study are the different factors from the questionnaire.

#### **4.5 Mode of Enquiry**

For the purpose of this study, I have used a multimethod strategy that combines quantitative data with qualitative data in order to add depth to findings (Swanson & Holton 1997:93). The multimethod strategy allows for the verification and triangulation of data.

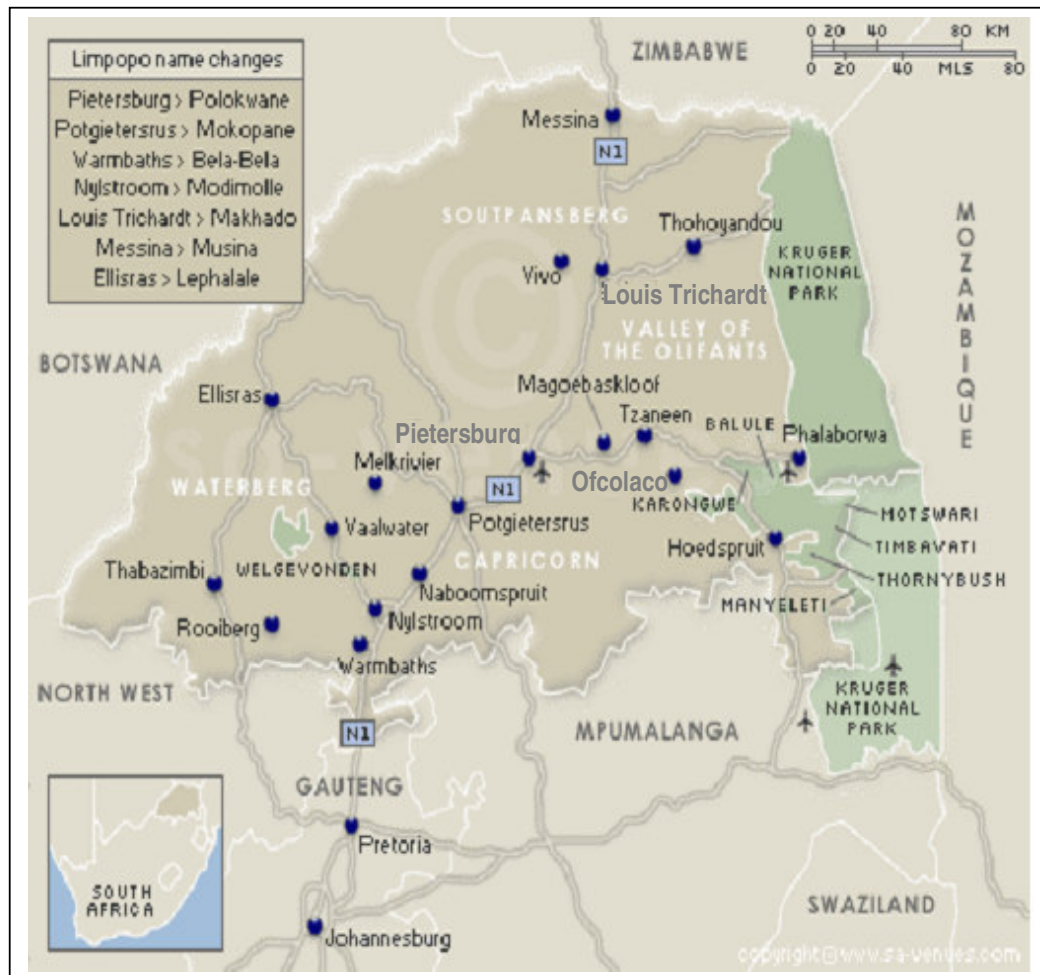
When collecting quantitative data I used a questionnaire. The qualitative data collection instruments consisted of individual interviews and focus group interviews. Confirmation and corroboration of data required that the researcher triangulate data (McMillan & Schumacher 2001:408).



## 4.6 Research Sites and Sampling

### 4.6.1 Research sites

The fieldwork for this study was conducted in the Vhembe District of Limpopo Province, Thohoyandou Circuit and Mutale circuit co-ordination, as defined by the Limpopo Province Department of Education and reflected on the map.



**Figure 4.2: Map of area containing sampled schools**

(See Appendix G for photographs of sampled schools)

### 4.6.2 Pilot Study

The questionnaire was initially applied to a group of 10 secondary school teachers whose mother tongue was not the same as the language of the test to identify potentially unclear instructions and items. Testees were requested to circle the numbers of and to underline phrases and words contained in the items they did not understand. On the basis of testees' reactions to the items, a number of items were modified.

### **4.6.3 Sampling strategy**

The teacher population is defined as Grade 12 teachers in the schools from which the sample was drawn. Quantitative data as well as qualitative data were derived from a population of Grade 12 teachers and school principals from the same schools in the sample.

As specified, schools were selected from two circuit co-ordination districts of Vhembe District in the Limpopo Province on the basis of their Grade 12 results for 2002 through 2006. Group 1 comprised the fourteen schools for which Grade 12 results fell in the range 75-100 per cent and Group 2 the ten schools for which Grade 12 results fell in the range 30-40 per cent.

A number of schools were selected according to the following criteria:

#### **4.6.3.1 Time criterion**

The sample was drawn according to the Grade 12 results for 2002 through to 2006.

#### **4.6.3.2 Achievement criterion**

Schools which fell within one of the following two ranges: 75-100 % (High performing) or 30-40 % (Poorly performing) were sampled.

#### **4.6.3.3 Region criterion**

The sample was drawn according to whether the schools were in the Thohoyandou area or the Mutale area (each called districts here, based on administration areas of the Department of Education) of Vhembe District, Limpopo Province, as a way of distinguishing whether they could be described respectively as urban or rural. (It was hoped to obtain equal numbers of rural

and urban schools, but this was not possible, given the Grade 12 results ranges required.)

In each school for which the sample was drawn, seven teachers were asked to complete the questionnaire, and the principal was interviewed (Appendices B and F).

**Table 4.4: Breakdown of sample used in study**

	<i>Group 1 Schools (Grade 12 results 75-100%) High Performing</i>		<i>Group 2 Schools (Grade 12 results 30-40%) 'Poorly Performing</i>		<i>Totals</i>
	<i>Thohoyandou District</i>	<i>Mutale District</i>	<i>Thohoyandou District</i>	<i>Mutale District</i>	
<i>No. of schools</i>	7	7	5	5	24
<i>No. of teachers</i>	49	49	35	35	168
<i>No. of principals</i>	7	7	5	5	24

The selection of schools in Thohoyandou District on the one hand, and in Mutale District on the other, was in order to gain some information on the differences between rural and urban schools (sections 2.3.1 and 2.5.1).

In the selected part of Limpopo Province, as in many others in South Africa, it is sometimes difficult to specify what is urban and what is rural. Some would argue that all of it is rural, and others would argue that much which may appear to be rural is in fact urban, due to the density of settlement and closeness to main roads. It is certainly true that Thohoyandou is fully urbanised in most senses of the word, with hotels, banks, municipal offices, regional headquarters of government offices not to mention the University of Venda. At the same time, as a district, it is spread over the mountains behind and the plain below, and settlement is somewhat haphazard, even out though well supplied with tarred roads and, more recently, electricity. Mutale, on the other hand, is definitely rural, having very few tarred roads and generally

being located on the northern and eastern side of the mountains (defined in fact by the Mutale River) overlooking the Limpopo Valley, nearer Pafuri than to Beit Bridge, and not far from the far northern borders of the Kruger National Park.

## **4.7 Multimethod Data Collection Plan**

For the purpose of this study, I used a multimethod strategy that has combined quantitative data with qualitative data in order to add depth to findings (Swanson & Holton 1997:93) as indicated in section 4.5 (Mode of enquiry).

### **4.7.1 Data collection methods**

#### **4.7.1.1 Quantitative part of the study**

From the quantitative (non-experimental) perspective, the mode of enquiry was descriptive and comparative because it allowed the assessment of the nature of existing conditions in order to categorise and compare factors (McMillan & Schumacher 2001:33).

When collecting quantitative data I used a questionnaire, which was also used when collecting qualitative data through the open-ended questions on the same questionnaire. This was intended to form the basis and initial data source so that further data collection by means of interviews with respondents and focus group interviews could be based on data gathered from the responses to the questionnaire.

I personally administered the questionnaire, and it was designed with the help of the Statistics Department of the University of Pretoria. The questionnaire includes closed-option questions as well as open-ended ones, the purpose being to derive frequencies for the different variables being explored, so that they could be described and compared. The closed-option questions serve to determine categories, characteristics and preferences associated with the

variables determined in advance (Chapters 2 and 3) for the target schools. Above all, they are designed to yield frequencies for specified variables.

The advantage of this survey method is that it enables the collection of data in a relatively short time. The method proves extremely efficient at providing large amounts of data, at relatively low cost, in a short period of time. The method also allows anonymity, in that individual teachers' names are not recorded, individuals being represented only by a number, thus encouraging frankness where sensitive issues are involved.

However, one weakness of the method is that it does not allow respondents to provide data in a way that shows them in a good light. In other words, it could be said to suffer potentially from a social desirability response bias.

#### **4.7.1.1.1 Questionnaire (Appendix A)**

The design of the questionnaire was aided by the pilot study, and went through several changes before being administered in its final form. Suggestions as to the questions and format were also taken from Dr P.A. Jones, a development worker in Limpopo Province with experience of teaching in a rural secondary school, and from the Department of Statistics of the University of Pretoria. In its design, care was taken to avoid the following (Babbie 1992:149-152):

- Lack of clarity
- Double-barrelled questions
- Irrelevant questions
- Long items
- Negative items
- Biased items and terms

The questionnaire was administered first to the teachers in the sample. In all there are sixty questions to be answered by the teachers, and the literature review contributed to their compilation in that the questions sought to elicit the

information described in 4.1 broadly divided into biographical data concerning the teachers, school factors, teacher factors and learner factors. (Appendix B)

#### **4.7.1.2 Qualitative approach**

From the qualitative (interactive) perspective, which could be described as a phenomenological one, I explored the experience and perceptions of the Grade 12 teachers and principals who were the respondents in the study by means of interviews and open-ended questions (Macmillan & Schumacher 2001:36).

The open-ended questions in the questionnaire, supplemented by the interviews, are designed to give respondents the opportunity to express perceptions and opinions for the purpose of ultimately fine-tuning and interpreting the frequencies derived from the questionnaires. For triangulation purposes, open-ended questions were included, mostly to provide indicators for the researcher as to difficulties and motivations experienced by the teachers, and the answers are not used in the frequency analyses or contingency tables.

The data were collected during deliberately created opportunities. An initial interview was sought with each school principal, in the course of which the purpose of the study was explained and the questionnaires presented for inspection.

A further interview was conducted with each school principal upon collection of the completed questionnaires before statistical analysis was undertaken. This made one-to-one interaction possible which allowed them to assess to what extent the quantitative data might be subjected to individual value systems, and thus influenced by qualitative personal bias from the participants having an opportunity to modify responses.

Qualitative research methods and techniques are appropriate to the social sciences because they are well suited to exploration and discovery in times of

rapid and fundamental change. This is certainly true of education in South Africa today.

Qualitative enquiry was deemed appropriate for the purpose of my study for the following reasons (Worthen & Sanders 1987:50):

- It is generally conducted in natural settings.
- It utilises the researcher as the chief instrument in both data-gathering and analysis.
- It emphasises thick description, that is it obtains real, rich and deep data which illuminate everyday patterns of action and meaning from the perspective of those being studied.
- It tends to focus on social processes rather than primarily or exclusively on outcomes.
- It employs multidata-gathering methods, especially participant interviews.
- It uses an inductive approach to data analysis, extracting its concepts from the mass of particular detail which constitutes the database.

The individual interviews and focus-group interviews were specifically designed to provide such a focus for the analysis of the data.

Ten specific themes have been suggested as a necessary part of a qualitative enquiry and action on the part of a researcher (Patton 1990: 40-41; Swanson & Holton 1997:95).

The following table indicates the relationships attempted in this study:

**Table 4.5: Themes identified by Patton-implemented research.**

<i>No.</i>	<i>Theme</i>	<i>Research Action Implemented</i>
1	Naturalistic enquiry (real world situation)	Questionnaires administered and interviews were conducted in schools
2	Inductive analysis (begins with collection of detail to lead to generalization)	I collected data by different means (questionnaire, interview, focus group) to establish links between findings in order to gain insights
3	Holistic perspective (phenomena understood as complex system)	Variables were grouped and compared in different ways to arrive at meaningful results
4	Qualitative data (collection of detailed description)	Open-ended questions were provided and interviews conducted to allow opportunity for self-expression
5	Personal contact and insight (personal contact between researcher and participants)	Interviews and focus groups were conducted personally by researcher
6	Dynamic systems (the object of study viewed as dynamic and changing during the study)	Questionnaires were completed and interviews conducted at different times – months apart
7	Unique case orientation (each research case is unique and special)	Each school was considered to be unique, hence enquiry about school culture as a variable.
8	Context sensitivity (placing of findings in a social, historical and temporal context)	The temporal context of the research (2000-2003) which was clearly stated in its title, and the geographical context reflected in section 4.5. and the inclusion of rural and urban as variables in the analysis, section 4.7.1.



9	Empathetic neutrality (assuming the researcher cannot be completely objective, this should not be an excuse to advance a personal agenda)	The researcher, although a Grade 12 teacher, is not on the staff of any of the schools researched nor a personal friend of any of the staff members of those schools
10	Design flexibility (enquiry process adaptive, potentially changing as the research is conducted)	The use of a pilot study to aid in the design of the questionnaire, as well as the interviews and focus groups to aid in the interpretation of the results provide for necessary change and flexibility.

(Adapted from Patton 1990: 40-41; Swanson & Holton 1997:95)

#### 4.7.1.2.1 Individual interviews (Appendix F)

Interviews with the 24 school principals were personally conducted by the researcher on a one-to-one basis. The principals were interviewed because they were considered to be in a better position than teachers to explain the different factors contributing to academic success.

The interview schedule (Appendix F), consisted of fifteen simple questions, and care was taken to ask questions which were flexible enough to allow for responses that were unexpected by the researcher (Baumgartner & Strong 1998:182).

Respondents were initially put at ease by engaging in small talk, which progressed to an explanation of the study. All the same excessive informality was avoided. Audiotapes were used as a back-up when interviewing principals.

#### 4.8 Role of the Researcher

As the researcher in a study like this, one needs to be a sensitive observer that records phenomena as faithfully as possible, while also raising additional

questions, checking out hunches and moving deeper into analysis of the data (McMillan & Schumacher 1993:393). It was important that the researcher should not be too far removed from the issues at the base of the enquiry.

In this case the researcher was a single individual, herself a Grade 12 teacher in a school within the research area, and a mother-tongue speaker of the principal language, Tshivenda, thus to a great degree sharing the culture of teachers and learners alike. All these contributed to an appropriate understanding of and sensitivity to the factors which emerged for investigation.

In addition the researcher's role was functional in the following ways:

- Initiating and assisting in the compilation of the questionnaire
- Administering the questionnaire to school principals
- Structuring the interviews with school principals
- Conducting the interviews
- Triangulating data
- Discussion of results and analyses with the Department of Statistics of the University of Pretoria
- Interpretation of results

## **4.9 Data Analysis Strategies**

### **4.9.1 Quantitative data analysis**

Statistical analysis was done by the Department of Statistics of the University of Pretoria. The following statistical techniques were used to test the hypotheses<sup>1</sup>:

Chi-square tests to determine the significance of difference between the variables.

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<sup>1</sup> The hypotheses were tested at the .05 level of significance.

“Chi Square statistics are designed to determine whether an observed number differs either from chance or from what was expected” and they test the dependency of variables upon one another (Coolidge n.d.:239,250). In other words, tests of the null hypotheses may be applied, and these hypotheses rejected at the  $p < .05$  level of significance. Such tests were duly applied, and not only to the main hypotheses concerning the relationship between the identified independent and dependent variables.

#### **4.9.2 Qualitative data analysis**

The data collected by means of interviews and document inspections were summarised and analysed, and, together with a summary of the responses to the open-ended questions on the questionnaire, were used to aid in the interpretation of the results.

#### **4.10 Quality Assurance Techniques**

##### **4.10.1 Qualitative techniques**

###### **4.10.1.1 Trustworthiness of qualitative data**

The focus of the interpretation of any social phenomenon, which is in this case the qualitative data from both the questionnaire and the interviews, should be viewed as something that can be used for better understanding. Denzin and Lincoln (2003) and Lincoln and Guba (1985) suggest the following in order to increase trustworthiness in a qualitative study:

- Credibility
- Transferability
- Dependability
- Confirmability

For the purposes of this study I sought to increase the credibility of the interview data by implementing member checking and peer review. Krefting

(1991) suggests that member checking, which is where the interviewee plays an active role in being part of the process, in bringing in his/her own meaning or interpretation of the data, is a form of triangulation and thus minimizes researcher bias (Creswell 2003). It was therefore planned that the teachers should be given the opportunity to review the data and make comments and/or changes where they felt it was necessary. In such peer review, the data are given to impartial colleagues who may have experience of the qualitative methods, and the research findings are then discussed (Krefting 1991). The focus group meetings were designed to serve this purpose.

#### **4.10.2 Quantitative techniques**

##### **4.10.2.1 Validity**

By validity is meant how well the test measures what it sets out to measure (Litwin 1995:33), and this case is distinct from the notion of design validity.

This study relies on valid, authentic and trustworthy methods of collecting and presenting information and interpretations as stated by Hammersley and Atkinson (1983:191).

To reduce by some degree the limitations of the research, certain measures may be taken to enhance design validity (McMillan & Schumacher 1993:389). The following table sets out what the researcher has done where this research was concerned according to the criteria set by McMillan and Schumacher (1993).

**Table 4.6: Actions taken to enhance validity of research design**

<i>Strategy</i>	<i>Description of Action</i>
Multimethod approach	The researcher conducted Interviews and a focus group meeting to aid the interpretation of quantitative data from the questionnaire.
Mechanically recorded data	The researcher used an audio cassette recorder during interviews and the focus group meeting.
Verbatim accounts	Interviews and focus group meetings exist in a fully verbatim form as a result of mechanical recording.
Consistency of application	A single questionnaire was used, duplicated for every respondent, and a single interview schedule used for all interviews conducted by the researcher.

**(Adapted from McMillan and Schumacher 1993)**

In this study I used two approaches to validity: face and content.

- **Face validity of the questionnaire**

Face validity is based on a cursory review of items by judges (Litwin 1995:35). A questionnaire was administered to elicit information. Certain steps were taken to facilitate validity of the questionnaire as in 4.7, 1.1. To ensure face validity in this study, experts in the field have given their opinion as to whether the items of the questionnaire, on the face of it, have determined the factors influencing Grade 12 results as discussed in section 4.7.1.1.

- **Content validity**

To demonstrate this form of validity, the instrument must show the appropriateness of the items to reviewers who have some knowledge of the subject matter (Litwin 1995:35). The items must also be validated by means

of a literature review. Both of these contribute to the external validity of the research.

In this study the literature review which validates the items – in this case the variables to be measured – was also used to determine the selection of the factors to be tested as influencing Grade 12 results as described in Chapters 2 and 3. Furthermore, the wording and positioning of the questions were checked by various experts. The subsequent statistical testing of the variables to determine their relationship to one another was therefore also a test of content validity, and internal validity was thus established.

- **Reliability**

Reliability is the degree to which an instrument measures what it is supposed to measure (Gay & Airasian 2003). Reliability thus refers to the degree of consistency and/or accuracy with which a questionnaire measures its variables (Mulder 1989:209). Mason (1996:24) maintains that reliability involves the accuracy of the research methods and techniques used.

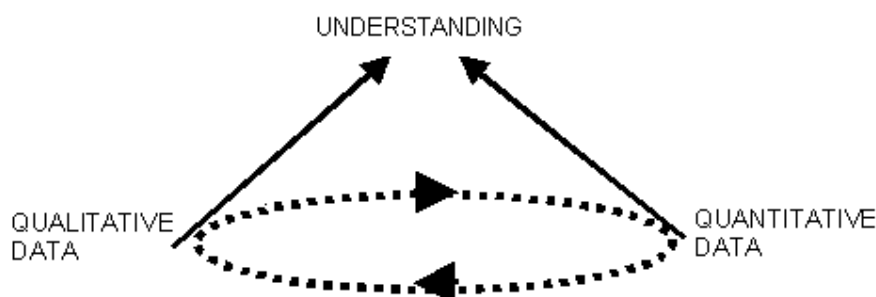
In this study, the reliability was checked by means of a computer analysis as discussed in section 4.9.1, Quantitative Data Analysis.

In addition to the described measures of validity and reliability, the researcher has attempted to provide as much information as possible about the research design and research methods. Triangulation was thus used to assess reliability of qualitative analysis. Due to the nature and design of the questionnaire (under the supervision of a previous supervisor, Prof T. Malan) the Cronbach  $\alpha$ 's could not be calculated. My current supervisors advised that I admit this as a limitation of my study.

- **Triangulation**

Triangulation is defined as the use of several different research methods to verify the same finding (Babbie 1992:109). It is maintained (Baumgartner &

Strong, 1998:184) that triangulation is the process of cross-validation among researchers, research methods and data sources. Triangulation is critical in establishing data-trustworthiness (Lather, 1986: 270 and Mcmillan & Schumacher, 1989: 418). Validity and reliability are enhanced by including triangulation in qualitative research (Maxwell, 1996: 94). Triangulation reduces the risk of chance association and systematic biases. Triangulation thus contributes greatly to a study's validity and may be expressed in terms of a diagram that pictures qualitative data interacting with quantitative data.



**Figure 4.3: Triangulation between qualitative and quantitative data**

Triangulation has been employed to determine whether multiple sources of data agree and thus make it possible to arrive at better, cross-checked insights (Burgess 1985:306). The proposed strategy for data analysis – i.e. frequencies compared by means of contingency tables and also tested for independence by the  $\chi^2$  test – is designed to facilitate such an approach. In addition, interviews and focus group meetings served to link the various data types. This gives depth to the interpretation of the results. In this study, triangulation essentially required the checking of the extent to which conclusions from quantitative sources are supported by a qualitative perspective, and *vice versa*.

There are basically four types of triangulation (Denzin 1990 in Hodgkinson 2000:109):

- DATA – which involve time, space and persons

- INVESTIGATOR – which consists of the use of multiple rather than single observers
- THEORY – which uses more than one theoretical scheme in the interpretation of any phenomenon
- METHODOLOGICAL – which involves the use of more than one method on the same object or study.

In order to facilitate triangulation of the data I used a range of techniques, normative or interpretive, used in combination or otherwise (Cohen *et al.* 2000:113).

For the purposes of this study data, theory and multiple methods of investigation have been employed as follows:

**Table 4.7: Types of triangulation used in the study**

	<b>Theory</b>	<b>Practice</b>
1. Data	Involve time, space and persons.	<ul style="list-style-type: none"> <li>• I have used the published school results, enabling the grouping of the sampled schools into two categories;</li> <li>• Data obtained from the principals of schools by means of interview.</li> <li>• Data obtained from teachers by means of questionnaire and I have also used data collected by means of document analysis.</li> </ul>
2.Theory	More than one theoretical scheme in the interpretation of any phenomenon	<ul style="list-style-type: none"> <li>• Obtained by means of the literature review.</li> </ul>
3. Multiple methods	The use of more than one method on the same object or study.	<ul style="list-style-type: none"> <li>• Obtaining the published school results.</li> <li>• Conducting interviews (qualitative approach).</li> <li>• Administering questionnaires and deriving frequencies therefrom (quantitative</li> </ul>



		<p>approach).</p> <ul style="list-style-type: none"> <li>• Administering questionnaires and comparing interviews and questionnaires (quantitative and qualitative approach).</li> <li>• Using documents to arrive at understanding and interpretation (qualitative approach).</li> </ul>
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(Adapted from Cohen *et al.* 2000:113)

In the questionnaire itself, information was structured in such a way that, in many cases, one set of information served as a double check on another, since virtually the same information was elicited – as in, for instance, the availability of laboratory and the availability of library facilities, both being measures of the level of school funding. The purpose of double checking was thus also a form of triangulation to increase the reliability of the information.

Other ways of cross-validation were sought by means of triangulation in the use of different variables, and calculating the strength of the correlation between them within each school group. Also used to facilitate triangulation were the different methods of data collection which included the use of individual interviews and the conducting of focus groups in addition to school results and the questionnaires (Baumgartner & Strong 1998:183-4; McMillan & Schumacher 1993:432).

#### 4.11 Ethical Measures

In the context of education, ethics are particularly important (McMillan & Schumacher 1993: 197), in that they deal with beliefs about what is right or wrong, proper or improper, good or bad. In this study the researcher considered the following ethical measures:

The researcher undertook to focus on the research questions and not to interfere in any manner that could jeopardize the integrity of data and the study as a whole. Respondents were assured that there would be no unpleasant or damaging effects on the individual or the setting (the school).

Prior to the commencement of data collection activities, the researcher undertook to communicate the aim, objectives, nature and future use of findings to participants.

Permission to administer the questionnaire and to conduct interviews was obtained from the Department of Education in Vhembe District of the Limpopo Province. Care was taken to follow ethical principles as recommended by Cohen *et al.* (2000:58). All the teachers who formed part of the sample completed and signed the informed consent forms (see Appendix A)

The questionnaires were delivered to the target schools by the researcher, after first obtaining permission from the principals. The questionnaires were handed to the principals who were requested to hand them to their Grade 12 teachers. So that teachers would not feel under too much pressure, they were given one week to complete the questionnaires in their own time. Questionnaires were thereafter collected by the researcher directly from the principals. Not all were completed, and the completion rate was as follows:

**Table 4.8: Return rate of questionnaires**

<i>School Type</i>	<i>Questionnaires</i>		<i>Return Rate</i>
	<i>Submitted</i>	<i>Returned</i>	
Group 1 schools	98	87	88,8%
Group 2 schools	70	51	72,8%

**(Adapted from Baumgartner & Strong 1998:183-4; McMillan & Schumacher 1993:432)**

A 70% return rate for questionnaires is considered sufficient to validate the findings of an investigation. More than this, “a response rate of at least 50 percent is adequate for analysis and reporting. A response of at least 60 percent is good. And a response rate of 70 percent is very good” (Babbie 1992:267).

After the questionnaires were collected, the researcher arranged to interview as many of the principals as could be available, persisting until all had been interviewed.

It was important, therefore, that the researcher should not interact with the respondents in any way that would suggest the violation of such ethics or that would impact upon the results of the investigation. The questionnaires were administered virtually anonymously, with the researcher only interacting on a personal basis with the school principals. In these interactions, particularly in the formally conducted interviews, it was necessary to put respondents at their ease; but this was done in a standardized way. At no point were the researcher's expectations discussed with the principals; only the methodology was discussed.

Great efforts were also made by the researcher to adhere to the following procedures (Du Plooy 1995: 45-169), in the ways described, I used the following framework:

**Table 4.9: Ethical procedures by Du Plooy 1995: 45**

<i>Procedures</i>	<i>Actions Taken</i>
<i>Protect the rights of human subjects by not causing emotional harm or infringing on their right to maintain self-respect and dignity</i>	The questionnaires were completed anonymously.
<i>Provide all necessary facts without distortion or misrepresentation</i>	The initial interviews with school principals allowed them to ask questions and have them answered to their satisfaction.
<i>Avoid being biased in the interpretation and presentation of data</i>	The follow-up interviews and focus group discussions allowed input of other viewpoints.
<i>Use measurements that are suited to the research problem</i>	Chi-square statistics applied were deemed appropriate to test the independence of frequencies
<i>Report conflicting evidence:</i>	By facilitating triangulation of data.
<i>Report any flaws or limitations in the research</i>	Discussed in section 4.12.

**(Adapted from Du Plooy 1995: 45)**

In addition the principals were promised that they would be provided with the results of this research.

#### 4.12 Delimiters of the Study

In all enquiry, account must be taken of the Hawthorne effect, which is the effect that the researcher may have upon that which is researched. This needs to be taken into account as a possible limitation in the conduct of the research as well as in the interpretation of the results. Various frameworks are available to aid the researcher (Patton 1990: 40-41; Swanson & Holton 1997:95). I used the following framework:

**Table 4.10: Quantitative delimiters**

<i>No.</i>	<i>THEME</i>	<i>DELIMITERS</i>
1	Neutrality and objectivity	The researcher is also a Grade 12 teacher so personal bias cannot be excluded in the framing and selection of the questions.
2	Hawthorne effect <sup>2</sup>	The respondents to the questionnaire, being Grade 12 teachers, could be assumed to be intelligent enough to realize into which category their school's results might fall (although categories were not mentioned to any of the respondents), and structure their responses accordingly.
3	Demand characteristics	In accordance with the Hawthorne effect, respondents may have selected options on the questionnaire which would either justify the poor performance of their school, or refute it.

<sup>2</sup> The 'Hawthorne effect' refers to the possibility that the way in which respondents complete a questionnaire may influence the results.



4	Selected sample	Given the fully specified geographical and results-level limitations on the research, all respondents could be assumed to have had an equal chance of being included.
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(Adapted from Patton 1990: 40-41; Swanson & Holton 1997:95)

A further framework applies to the qualitative aspects of the study (compare with Table 4.6.):

**Table 4.11: Qualitative delimiters**

<i>No.</i>	<i>THEME</i>	<i>DELIMITERS</i>
1	Naturalistic enquiry	All respondents were functioning educators at the Grade 12 level, and their qualifications and experience formed part of the gathered data
2	Inductive analysis	The fact that data collection and interpretation were performed by one person only, potentially impacted positively on the way in which results were obtained.
3	Holistic perspective	Since this study refers to the grouping and comparison of data, both qualitative and quantitative facilitating triangulation was used.
4	Qualitative data	Qualitative data were used in conjunction with quantitative data.
5	Personal contact and insight	Researcher also a Grade 12 teacher, so personal bias cannot be excluded.
6	Dynamic systems	Although a range of three years was considered where Grade 12 results were concerned, teachers from only one year (2004) were canvassed.



7	Unique case orientation	Not only does the research confine itself to Grade 12 results in certain years only, but the research was conducted in a limited area of the Vhembe District in the Limpopo Province.
8	Context sensitivity	Environmental influences and differences were only canvassed in terms of language, and school locality. Pupils' home background and distance from school were not used in the analysis and interpretation of results.
9	Empathetic neutrality	Researcher also a Grade 12 teacher, so personal bias cannot be excluded.
10	Design flexibility	Once the questionnaire was printed, and the interview schedule used for the first time, there was no need to alter the questionnaire. In the case of interview, the researcher had a better chance to be flexible. Questionnaire results expressed as frequencies, however, did allow for varieties of statistical manipulation in order to determine what was most appropriate.

(Adapted from Patton 1990: 40-41; Swanson & Holton 1997:95)

#### 4.13 Summary

In Chapter 4 a description of the research design has been provided. The statistical techniques that were used to test the hypotheses in this research were also identified.

The next chapter deals with the results of the empirical investigation with regard to factors influencing Grade 12 results.