

AN ASSESSMENT OF THE EFFECTIVENESS OF PUBLIC AND INDEPENDENT SCHOOLING IN GAUTENG

Sherline Pillay

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of Management in Public Policy
Supervisor: Professor Susan Booysen
Co-supervisor: Dr Mike Muller

DECLARATION

I declare that this research report is my own, unaided work. It is being submitted for the degree of Master of Management at the University of Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in any other university.

Sherline Pillay

31 day of March 2009

DEDICATION

This work is dedicated to Premilla, Veerasamy, Mala, Jesika, Melissa, Boogie and Samantha Pillay.

For their love and support and to inspire them to reach all their goals and dreams in life. To my spiritual guides Atman and Hakim for their support and guidance throughout this study.

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ABSTRACT

In the last decade there has been universal concern on *school effectiveness*. Studies on school effectiveness indicate that various authors use different definitions and it is difficult to settle on a single definition for the concept. Furthermore the factors that contributes to good learning, a notion that is closely associated with that of school effectiveness may leave the reader wondering whether for example learners from poor backgrounds will have more difficulty learning than those from more affluent homes. This question is relevant for a country such as South Africa in which the socio-economic status of citizens is highly skewed. Central to this quest, is to find a common instrument to measure the effectiveness of schools. This is not easy when considering the various factors that influence learning and teaching. The focus of this study was therefore to identify an indicator that makes one type of school more effective than another. The comparison in study is between public and independent schools, using the indicator of the Senior Certificate Examination for 2002 to 2006 and assessing, on this basis, whether it is public or independent schools that delivers more effective schooling.

To operationalise this research objective, the study used a sample of all public and independent schools that wrote the Senior Certificate Examination for 2002 to 2006. The researcher considered two types of independent schools (independent and independent subsidised) and public schools in the disaggregation of the data for this study. Independent subsidised schools are partly funded by the government while independent schools receive no funds from the government and rely on school fees. Only quantitative data analysis was used. Regression analyses were used to investigate the relationship between matriculation pass rates, school fees and learner-to-educator ratio. The effect of type of school on learner performance in the matriculation examination was also investigated using regression analysis.

A simple statement deeming one type of school more effective than another is simple when using the average pass rates for the Senior Certificate Examination. When comparing the average pass rates the public sector

schools consistently performed better than those in the independent schooling sector. However on closer statistical investigation of the data over the five years the researcher discovered that the average pass rates of the schools were not normally distributed. There are schools in the public, independent and independent subsidised sector that performed very well and those that performed very poorly. A series of statistical tests such as the Analysis of Variance (ANOVA) Kruskal-Wallis and Pearson's Chi-square tests were thus performed. The top 5 per cent of schools were removed from the analysis as schools producing 96 to 100 per cent pass rates were all considered in the rank of 'acceptably good performance'. This resulted in the data being more normally distributed and allowed for further analyses of the pass rates. Other analyses include a comparison of the endorsement rates in both sectors and Mathematics and Physical Science results for the three types of schools.

ACRONYMS

National Department of Education	DoE
Education for All	EFA
Education Management Information System	EMIS
Ex-Department of Education and Training	EX-DET
Ex-Transvaal Education Department	EX-TED
Ex- House of Delegates	EX-HOD
Ex-House of Representatives	EX-HOR
Further Education and Training	FET
Gauteng Department of Education	GDE
International Association of Educational Achievement	IEA
Independent Examinations Board	IEB
Learner-to-Educator-Ratio	LER
Learners with Special Education Needs	LTSEN
Millennium Development Goals	MDGs
National Assessment of Education Progress	NAEP
National Education Policy Act	NEPA

Progress in International Reading Literacy Study	PIRLS
Organisation for Economic Co-operation and Development	OECD
Southern African Consortium for the Monitoring of Education Quality	SACMEQ
Trends in International Mathematics and Science Study	TIMSS

CHAPTER 1

INTRODUCTION AND ORIENTATION TO THE STUDY

1.1 INTRODUCTION

It is a widespread perception in South Africa¹ that those learners who attend independent (or private)² schools receive an education that is superior to those who attend public schools. According to Kingdon (1996:1) some of the reasons proposed for the (perceived) superior efficiency of independent schools are that these schools are accountable to parents who pay school fees and the competition amongst independent schools for learners' results in better quality services. Kingdon (1996: 1) further argues that there are various studies which examine the link between different indicators of schooling received and labour market performance. It is, therefore, important that learners receive an education of acceptable standard in order for them to perform adequately in the work environment and become productive citizens.

Although most of these studies define school effectiveness in different ways, the common conclusion is that the quality of education received is an important factor in explaining the variations in the productivity and participation of individuals in the country. This evidence of the link between quality education and productivity emphasises the importance of education from an economic efficiency perspective. If any school is providing superior education compared to other schools, then learners attending these 'better' institutions may have an advantage over others in the long term. From my personal experience I have heard many parents comment on the effectiveness or lack thereof of the public or independent school their children attend. The reasons for people's perceptions vary and this prompted me to

¹ With reference to Henning (1993:10) in which he confirms that surveys conducted in South Africa reveal that more parents would choose independent schools over public ones if they could afford it.

² The words 'independent' and 'private' schools are used interchangeably in this report. In most international studies the non-public schools are called private but in South Africa they are called independent. Furthermore, the South African Schools Act of 1996 distinguishes between independent and public schools by ownership criteria. "Independent schools are those which any person may at his or her own cost establish and maintain..." There is also a distinction between independent schools which receive no subsidies from the government and independent schools which receive subsidies from the government (to be referred to by the term 'independent subsidised').

investigate whether it is public or independent schools³ in the Gauteng province of South Africa which provide more effective education.

According to Dieltiens (2003:3) there are continuous heated debates between proponents and opponents of independent education. Muller (1990: 70) argues that researchers have developed various techniques to attempt to answer the question of whether independent schools do produce better educational outcomes than public schools or whether these outcomes are as a result of irrelevant factors to the independent school environment – such as background of the learner, cognitive potential and so on. The debate of public or independent schooling weighs on most people's minds as the citizens of South Africa search for the best education possible for their children. The problem with comparing public and independent schools is that there are so many factors which make them different. Firstly, independent schools are not obligated to admit every learner who applies to the school, learners can be screened according to their cognitive abilities, while public schools have to admit all learners residing within a particular radius around the school and there are no entrant's examinations or criteria to meet. Inequities between the two sectors such as learner discipline, learner-to-educator ratios (LERs), teacher qualification and funding are also glaring but the impact of these factors on learner performance will have to be established. The other issue to consider is the benchmark used to compare the two sectors. Both these sectors seldom write the same examinations at the respective grade levels.

Internationally there have been several efforts to evaluate the effectiveness and efficiency of the education system of different countries. There are inputs to schools, processes within schools and then outcomes which have to be measured. There are international studies such as those of the Organisation for Economic Co-operation and Development (OECD), the Programme for International Student Assessment (PISA) and the Southern and Eastern Africa Consortium for Monitoring in Education Quality (SACMEQ) which make it

³ As Henning (1993:8) indicates it is important to increase the competition between public and independent schools, as this will result in increased efficiency of the education system.

possible to compare the quality of education across education systems in different countries. These assessments provide information about the degree to which education systems are successful in promoting the relevant skills and knowledge to learners at a particular age. In order to make any comparison of the education systems across countries and in particular grades, it was, therefore, necessary for the researchers to use a common test or examination as an instrument of investigation. According to Dieltiens (2003:8) the Senior Certificate Examinations is an important indicator of the performance of the South African education system. The Senior Certificate Examination is the final assessment tool which learners participate in before venturing into future tertiary studies or potential employment. There are both independent and public schools writing these examinations and it is, therefore, the common instrument in the context of South Africa. It will thus be used in this study to compare the effectiveness of public and independent schools in Gauteng.

1.2 RESEARCH ORIENTATION

Learner performance in the Senior Certificate Examination has been one of the major indicators of the quality of education, as South Africa has few national examinations (especially in primary schools) to gauge and compare the performance of learners.

The Gauteng Department of Education (GDE) concluded that nation-wide testing of achievement is an essential component to respond to public demands for greater quality and accountability (GDE Monitoring and Evaluation Framework, 2008:19). The Framework explains the importance of assessment programmes which provide information that educators and parents can use to improve learning and also provide an informed basis upon which those with an interest or role in education can make judgments about the performance of schools. One common assessment tool mentioned in the document that can be used is the annual Senior Certificate Examination. The results of the examination are used by education planners and managers to evaluate the progress made and by parents as a motivation for the choice of school for their children.

It is important to identify what is meant by effective education and to determine yardsticks for its measurement so that a fair comparison of public and independent schools can be made. The focal issue in this research report will thus be the use of Gauteng Department of Education's (GDE's) data to estimate the difference in performance, or educational attainment, of learners attending either an independent or a public school. The results of the Senior Certificate Examination can be disaggregated by province and by relation of schools with the state (public and independent schools) – these comparisons will therefore be possible. The pass rates of all public and independent schools writing the Senior Certificate Examination will be used to constitute the measure to compare the public and independent sectors. To increase the accuracy of the research results the data were not drawn from one year but from five consecutive years (2002 to 2006).

In an analysis of matriculation results in South Africa, Crouch and Mabogoane (1998:1) question whether the education system's performance is linked to resources. One of their arguments is that even "...rather well-resourced schools" do not perform well. This, however, does not ease the common public definition of effective education, which is tainted with the view that well resourced schools produce better results. A 2004 report by the Australian Council of Education Research, entitled "Why parents choose independent or public schools", offered research findings on the phenomenon. It found that 34 per cent of surveyed parents with children in public schools would change to an independent school if the fees were no more than for public schools (Beavis, 2004: 8-9). The most frequently cited reason from the same report was the view that education was better in these independent schools. This, however, also means that 66 per cent of parents were satisfied with the quality of education in public schools and would not pursue access for their children to independent schools, should they have the choice.

It is important to bear in mind that the variances in learner performance can be due to any number of factors besides the public or independent status of the schools that is contextualised by the likely availability of resources. It is not

the intention of the researcher to explore inclusively all factors affecting the general effectiveness of education in Gauteng. However, the issue of the school fees charged is an important factor which affects parental choice of schools. Fiske and Ladd (2003: 15) argue that school fees may affect the quality of schools by awarding schools the opportunity to purchase additional resources such as educators that may enhance learner performance. Dieltiens (2003: 8) maintains that the learner-to-educator ratios (LERs) hint at the quality of education in independent schools, because the lower the learner-to-educator ratio the greater the individual contact between learner and educator. Dieltiens (2003) further argues that smaller class sizes are related to school fees. He explains that in the Independent Education and Development Project (PRISED) case studies concluded that the lower the LER the higher the school fees and vice versa. Learner-to-educator ratios are definitely higher in public schools in Gauteng; in some cases the ratios in public schools may be twice that of independent schools (GDE Annual Report for 2007). The researcher, therefore, also investigated the relationship between school fees and LERs on the performance of learners in the Senior Certificate Examination.

1.3 MOTIVATION TO USE GAUTENG AS A CASE STUDY

In this report the researcher used the Gauteng province as a provincial case study to compare the effectiveness of education in public and independent schools. There are several reasons for this choice. The Gauteng province is the financial and industrial heart of South Africa. It is one of the most densely populated provinces and also the wealthiest of the South African provinces. Since it is more urban than most provinces, it also represents a powerful example of independent schooling in the country. Independent schooling is about affordability; as only parents that can afford to pay the usually higher fees may choose to send their children to independent schools (Henning, 1993: 14).

A further reason for the choice of Gauteng as provincial case study is the high prevalence of independent schools in the province. This prevalence helps to ensure that there will be a statistically sufficient basis for comparison and

analysis. The sector has grown by 21 per cent between 2002 and 2006 in terms of learner numbers and 7 per cent in terms of the number of institutions (EMIS Headcount Databases for 2002 to 2006). The growth in the sector also indicates parents' confidence in independent schools. In 2006 there were 394 independent schools (primary and secondary) with a total of 162,535 learners. This represents 10 per cent of learners in ordinary schools in Gauteng. There were 278 secondary schools with a total of 69,379 learners (Headcount Survey Report for 2006).

This occurrence of learners and institutions illustrates the significance of the independent schooling sector in Gauteng and why it is a suitable case to be used, to assess through the measure of senior certificate performance, whether the independent sector can be argued to be superior to its public counterparts.

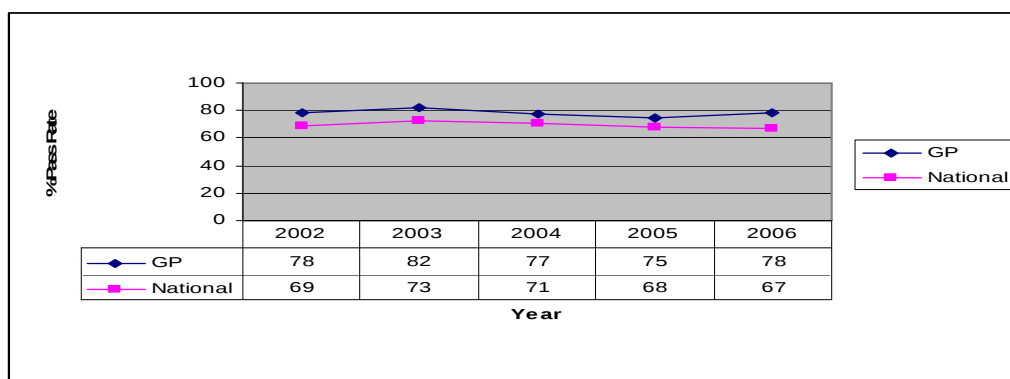
1.4 PROBLEM STATEMENT

In a case study of urban India, Kingdon (1996:1) states that one of the most important aspects in the debate of quality in education is the independent versus public provision of education. South Africa has emerged from an apartheid system and central to the transformation of the inequitable political, economic and social structure of that era is the establishment of a quality, equitable and democratic system of education (Motala, 2003: 2). Budget limitations and the ever-increasing school-age population have caused the South African government to re-examine the role of independent input into education (Dieltiens, 2003: 11). Apart from independent schools, the public schools were also partially privatised in an attempt to cut government expenditure. The South African Schools Act of 1996 gives School Governing Bodies the right to charge school fees. This was also an attempt to maintain middle class learners who would otherwise leave the public education sector for independent schools (Fiske and Ladd, 2003:5).

There is thus a real need to compare the effectiveness of education in public and independent schools in order to provide answers to questions regarding the comparative quality of education, and how this is manifested in the

Gauteng education system. This will also result in the investigation of the possible progress that the Gauteng education system has made in the period of 2002 to 2006.

Figure 1: Comparison of Senior Certificate pass rates in Gauteng and at national level



Source: Adapted from Gauteng Department of Education Annual Report for 2007

Figure 1 demonstrates that the senior certificate pass rate in the Gauteng province has been consistently higher than the national pass rate between 2002 and 2006. The graph shows that there was an increase in the pass rate between 2002 and 2003 but the pass rate declined in 2004 and 2005. In 2006 the pass rate again increased. In 2004, the difference between the provincial average and the national average decreased because there was a substantial decline in the provincial pass rate, namely from 82 per cent in 2003 to 77 per cent in 2004 and in 2006, when it was 78 per cent. The pass rate in the Senior Certificate Examination gives an idea of the standard of results produced in the province compared to the rest of South Africa. The contribution of the independent schools to this percentage has to be established.

There are several additional reasons why the matriculation results produced by schools are of importance to both the Department of Education and all other interested stakeholders in education. These include the fact that schools that produce poor annual matriculation results have to take into consideration the huge amount of money spent on education. Schools as public institutions, and educators, as public servants, should be accountable for the amount of money spent every year for education whilst they continue to produce poor results in the Senior Certificate Examination. Similarly, independent schools

also have a responsibility, albeit to parents, because parents pay large amounts of money for the education provided.

The comparison of public and independent schools by means of the analysis of the respective pass rates that are achieved will shed light on a number of issues. First, there is the direct dimension of the comparative effectiveness of education (as assessed through matriculation pass rates). Second, a comparison of the pass rate in public and independent schools will enable informed interventions and choices. All stakeholders, including departments of education, school management teams, learners, educators, parents and the community, could be empowered through results of this study about the comparative effectiveness of the two types of schools. Empowered with this type of knowledge, informed decisions could be taken regarding choice of schooling, especially for the province of Gauteng, or for individual families. Thirdly, the data could be used to help highlight essential educational issues, thus contributing to effective teaching and learning in all schools.

1.5 PURPOSE OF THE RESEARCH

The purpose of this research project is to do a differentiated assessment of the comparative quality of public and independent education, based on matriculation results, in the province of Gauteng, South Africa. The factors of learner-to-educator ratio, school fees and type of school, as well as how these correlate with learner performance in the Senior Certificate Examination, are also considered.

The Department of Education is concerned with the redistribution of resources that has been evident since the beginning of democracy in South Africa in 1994. The growth of the independent sector in education can be seen as a flaw in this process as these schools may be better resourced than public schools. The debate between public and independent schools arises in trying to provide learners with a common educational experience in any school, while simultaneously allowing people the freedom of choice of school. All learners receiving education in any school should ideally be able to produce

the same level of achievement even if the learners were moved from one school to another.

Every year the results of the Senior Certificate Examinations trigger considerable debate in the media and amongst the public regarding the quality of education provided by education institutions. Researchers, academics, government officials and journalists either question or justify the significance of these results. For example, researchers such as Shindler (2004) analyse the matriculation results nationally according to different variables to report on the health of the education system. From these studies it is clear that questions on the differences in quality between public and independent schools are difficult to answer in the absence of common performance measurements. However, the intention of this research project is to address this question with the measurement tools that are available at this time, namely the matriculation results.

The measure of school quality has regressed into inputs of the education system and the important issues such as students' characteristics, their home backgrounds and teacher variables are not taken into account (Kingdon, 1996:3). The inputs of education include physical resources, funding and human resources, all of which are necessary for learning to take place. It is important to determine whether these inputs make a difference to the quality of education provided by measuring the quality of the outputs or outcomes. Although learner performance is not the only outcome of education, it is one of the most important and one of the most measurable outcomes.

1.6 RESEARCH OBJECTIVES

According to Postlethwaite (2004:13) effectiveness in education can only be measured if all schools are able to produce the same level of performance. To explain this point further will mean that if schools are regarded as 'equal' in terms of the quality of education then if a learner went to any school (public or independent) he or she is likely to produce the same results. Postlethwaite (2004:23) bases this argument on the Vietnam grade 5 survey and on the

studies undertaken by the International Association of Educational Achievement (IEA), the Programme for International Student Assessment (PISA) and the Southern and Eastern African Consortium for Monitoring Educational Quality (SACMEQ). Postlethwaite (2004:11) points out that the assumption that schools with better resources perform better has been severely challenged by numerous studies carried out in the 1980s by a number of education economists. These economists demonstrated that in industrialized countries the variability of school resources was not positively correlated with the variability of learner performance.

In terms of the South African context, it is to be noted that the majority of the schools in Gauteng have reached the minimum level of resources which allows learning to take place so the variability in learner performance may be attributed to other factors such as educator qualifications, management (possibly of a poor nature) of schools, the effects of HIV/AIDS, the operational activities of the school and other characteristics of the pupils. It is not the intention of this research to investigate the actual factors affecting learner performance, but rather to establish whether irrespective of inequalities in inputs there is indeed a difference in the education in public and independent schools. In order to do this the research aims to:

1. Compare the learner performance in the Senior Certificate Examination in public and independent schools in Gauteng between 2002 and 2006.
2. Investigate whether independent schooling is more effective (in terms of performance in the Senior Certificate Examination) than public schooling in Gauteng.
3. Investigate the relationship between the variables namely, type of school, learner-to-educator ratio, school fees and learner performance in the Senior Certificate Examination.

1.7 RESEARCH QUESTIONS

The researcher will seek to address the following primary research question:

- 1.7.1 Is there a difference in performance in the Senior Certificate Examination (as a measure of effectiveness in education) in public and independent schools in Gauteng in the period 2002 to 2006?

This primary research question is supplemented by the secondary question:

- 1.7.2 What is the relationship between factors such as type of school, learner-to-educator ratio and school fees on learner performance in the Senior Certificate Examination in public and in independent schools in Gauteng in the period 2002 to 2006?

1.8 INTRODUCTION TO RESEARCH METHODS USED

In order to assess the effectiveness of education in public and independent schools the researcher used quantitative research methods. The research involved a multi-year analysis of matriculation results for public and independent institutions (only independent schools writing the national Senior Certificate Examination will be included) from 2002 to 2006. Independent schools also have an option of writing the school-leaving National Senior Certificate offered by the Independent Examinations Board.⁴ The reason for choosing the data sets for these years is that the structures of the databases are compatible, whilst the databases for years preceding 2002 are not. The use of multi-year analyses also increased the validity of the findings than if just one year was used. Regression analysis was also used to investigate the relationship between type of school, school fees, LER and learner performance in the Senior Certificate Examination for 2002 to 2006.

⁴ The Independent Examinations Board is a South African independent assessment agency which offers examinations for independent schools. It is most well-known for setting the examinations for the school-leaving National Senior Certificate which many independent schools in South Africa write (Wikipedia: 2009).

The data were obtained from the Education Management Information Systems (EMIS) unit of the GDE. The researcher had access to all data required for the purpose of the research project as she is employed by the Gauteng Department of Education in the Monitoring and Evaluation Unit. A letter of approval was obtained from the Head of the Education Policy and Planning Division to use the data for the purpose of the research. Chapter 3 provides the full exposition of the research methodology of the report.

1.9 CONCEPT CLARIFICATION

This section highlights a number of concepts that are crucial to the research project. These include school effectiveness, educational indicators, quality of education and assessment. These conceptualisations will serve to give the reader insight into the researcher's perspective and use of these terms, thus contributing to the credibility and verifiability of the study. Chapter 2 offers the detailed expositions.

1.9.1 School Effectiveness

According to Scheerens (2000: 18) school effectiveness may be defined as the performance of the organisational unit called 'school'. Further, Scheerens explains that:

The performance of the school can be expressed as the output of the school, which in turn is measured in terms of the average achievement of the pupils at the end of a period of formal schooling.

The purpose of this study is to assess and compare the effectiveness of education in public and independent schools. A school, for the purposes of this study, will be considered as more effective, or offering better quality education, if it produces a higher percentage pass rate in the Senior Certificate Examination than other schools.

Chapter 2 provides greater clarification on this concept.

1.9.2 The indicator concept

Educational indicators are policy-relevant statistics that are designed to provide information about the condition, the stability or change, the functioning or the performance of an education system or a part of it (Tuijnman and Postlethwaite, 1994:48). Indicators, therefore, provide decision-makers and other stakeholders with information that can be used to assess the soundness and progress of the system. The indicator can act as a signal to warn or reassure decision-makers about the health of the system. The Senior Certificate Examination may be regarded as an indicator of the performance of the education system in South Africa (Dieltiens, 2003:8).

Riley and Nuttall (1993:1) provide insight about the general debate on performance indicators. They describe nationally compiled indicators of performance such as standard assessment tasks, or the publication of performance on public examinations as the “new education currency”. These signals or measures can, therefore, be used in decision-making and the planning of education processes.

1.9.3 School quality

According to Galabawa and Alphonse (2003:1) the issue with regards to quality in education is categorised by the question of whether schools are preparing learners with the appropriate skills and knowledge to participate meaningfully in society. Further Galabawa and Alphonse (2003:1) argue as follows regarding the quality and assessment of learner achievement:

The focus on quality education is therefore broadened to include active and participatory approaches that are particularly valuable in assuring learning acquisition and also allowing learners to reach their fullest potential. This will certainly be possible if there is a definition of acceptable levels of learning acquisition for the provided educational programmes and if these acquisitions are improved on overtime by effective and efficient systems of assessing learner achievement.

Some of the characteristics of quality education include quality and motivated teachers, quality leadership, good infrastructure, acceptable nutrition and health, evaluation and assessment systems and language of learning and teaching (Galabawa and Alphonse, 2003: 2). However, Galabawa and Alphonse (2003:2) argue that the other characteristics may seem irrelevant when a school cannot produce consistently good results because from the perspective of the learner, parent, educator and employer “quality is excellence measured by student achievement, performance and values”.

The quality of education is reflected in the pupils’ achievement and can be used to make value judgements of the system (Scheerens, 1992:53-60). Further Scheerens (1992: 53-60) argues that:

... The most effective schools and school systems monitor and intervene at the level of individual learners. This is essential if the system is to deliver consistently strong performance throughout all its schools.

In a presentation to the conference *New Millennium Business* Taylor (2001) argued that because the purpose of schooling is learning it is obvious that the quality of knowledge, skills and attitudes displayed by learners is the ultimate indicator of the system outcomes. Further Taylor (2001) argued that in South Africa the only learning outcome that can be used to measure quality in education is the Senior Certificate Examination.

1.9.4 Assessment or testing

Tuijnman and Postlethwaite (1994:3) define assessment as:

...the techniques used in collecting information about educational outcomes either subjectively by using experienced judgements or by means of standardised, objective tests measuring cognitive-but sometimes also non-cognitive – aspects of learning and student performance.

This is also the conceptualisation that will be used in this study.

1.10 LIMITATIONS OF THE STUDY

This study had several possible limitations. In the implementation of the research, the researcher took several measures to try to ensure the minimisation of such limitations.

Any research project involving a single researcher may have the tendency to project the personal view of the researcher. Triangulation in terms of quantitative data analysis may not always be possible. However, all statistics used in this study were verified by two other researchers. The researcher has insured that this verification took place at the source, which is the Gauteng Department of Education by the Director of Education Policy Planning Reporting and Evaluation and on the second level by the co-supervisor Dr Michael Muller.

The sample used is from one province, Gauteng. It was thus a relatively small sample and may not be fairly representative of the situation in South Africa in general. In order to deal with this issue, the researcher used all public and independent schools in Gauteng which wrote the Senior Certificate Examination for 2002 to 2006. This increased the sample size substantially.

The average pass rates of schools were used. This may not reveal the distribution of scores in a particular sector. There may be schools that perform poorly as well as those that produce good results. However, when using the average pass rates for the school sectors these differences may not be evident. In order to overcome this problem, an analysis of variance of the distribution of scores in the different types of school was performed.

To further increase the accuracy of the results data were not drawn from one year only, but instead included data for five consecutive years. This reduces the influence of factors that may have been pertinent for a single year only.

1.11 EXPOSITION

This study will be revealed as follows:

Chapter 1 is an orientation of the research, which lays the foundation for the whole study. This chapter, as evidenced up to this point, focuses on the introduction, research orientation, motivation for using Gauteng as a case study, problem statement, purpose of the research, research objectives, introduction to the research methods used, clarification of concepts, limitations of this study, exposition of the research and summary.

Chapter 2 reviews the relevant literature which is divided into the main themes of the research. These include school effectiveness, the debate of public versus independent education, the use of Mathematics and Physical Science results, school fees and LER. A review of policy that is relevant to the study is also discussed in this chapter.

In Chapter 3 the research design and the details of the research methodology are discussed. The research methodology will be based on quantitative research methods. Regression analysis will be used to investigate the relationship between type of school, school fees, LER and learner performance in the Senior Certificate Examination.

Chapter 4 deals with the analysis of the data and a discussion of the research findings. Data will be analysed, presented and interpreted in this chapter. The researcher will show how the data was used to investigate which sector, the public or independent, is more effective.

Chapter 5 provides a review of the study, important findings from the literature and the quantitative data analyses, recommendations and conclusions of the study.

1.12 SUMMARY

In this chapter the importance of comparing public and independent schools using a common indicator was discussed. The motivation for using Gauteng as a case study for South Africa was indicated and the necessity of this research was outlined. The research problem and purpose of the study were established. The research objectives and research questions were outlined to give direction to the study. The research methodology and concepts used were clarified to make the reader familiar with the use of these in the rest of the report. The limitations of the study were also explained.

Chapter 2 will focus on the literature review related to school effectiveness and the factors affecting learner performance such as school type, school fees and LER.

CHAPTER 2

LITERATURE SURVEY AND THEORETICAL FRAMEWORK

2.1 INTRODUCTION

The first chapter of this research report provided the background and motivation for using the Senior Certificate Examination to assess the effectiveness of public and independent schools, with specific reference to the province of Gauteng. In this chapter the researcher will review literature related to the study so that a foundation can be built to anchor the research. A literature survey will therefore place this research in perspective and also assist the researcher in developing a conceptual framework to collect, examine and analyse the data.

Scheerens (2000:19-20) comments that the achievement in basic subjects such as mathematics, science and vernacular or foreign languages is the gauge chosen for the majority of empirical studies on the effectiveness of education. Further, he explains that the measures of school effectiveness are based on comparative rather than absolute standards. The 'effects' which Scheerens refers to may be expressed as the difference between adjusted means or percentages in which the variations between schools are explained.

The literature review in this chapter seeks to relate the quantitative data analysis to the theory and literature available. In this research report the researcher used quantitative research methods to compare the effectiveness of education in public and independent schools. It is therefore important to link the literature review to the method of analysis as well as to provide the reader with a backdrop for the entire research project.

2.2 THEORY AND THE LITERATURE

This section first explores the literature that attempts to theorise the meaning, measurement and assessment of quality or effectiveness of education as defined in this study, the debate of public versus independent schooling in

terms of providing effective education and the importance of the factors school fees, and learner-to-educator ratio. These represent the arguments in this chapter. It will also be indicated that there is little literature available on comparable studies for public and independent schools that might have been undertaken in South Africa in recent times. The chapter thus simultaneously demonstrates the need for a study such as the current one, and offers further direction on the assessment of public and independent schooling in South Africa.

2.2.1 What is school effectiveness?

In order to answer the questions dealt with in this study it is important to outline what various researchers identify as school effectiveness. There are various authors who provide a variation of definitions for an effective school and it becomes difficult to distinguish amongst these (Scheerens, 2000: 9). In his review of literature on school effectiveness Jansen (1995: 3) confirms that the early studies related to school effectiveness relied on large sample regression and correlation analyses of school inputs and outcomes.

These early researchers, as Jansen pointed out, included those such as Coleman (1966) and Jencks *et al.* (1972) who conducted research in which correlation analyses were performed between the family background and school attainment. In their studies, Coleman (1966) and Jencks *et al.* (1972), concluded that the family background of learners is the major influence on learner attainment and that the school and interventions have little or no impact. This study did not go uncontested as it had a negative impact on educators and schools in general. In response to the negative findings by Coleman (1966), Rutter (1979) investigated the school effects on children's behaviour and attainment. The findings from Rutter's study confirmed that schools are important and that resources, such as educator's, infrastructure, class size, etc. do have an impact on academic attainment. This caused the renaissance of the studies on school effectiveness.

The main questions around school effectiveness that subsequently needed to be addressed, and are also the focus of this study, are: What is school effectiveness? Which indicators can be used to measure school effectiveness and do different types of schools (public or independent) have the same effect on learner achievement?

Tuijnman and Postlethwaite (1994:35) argue that home backgrounds are related to the achievement of learners as schools serve as neighbourhoods that vary in the levels of backgrounds of learners. Learners who have good home backgrounds have higher achievement than those from poor backgrounds. It is not the intention of the researcher to establish the background of learners from public and independent schools; what is relevant about the research performed by Tuijnman and Postlethwaite is their method of distinguishing “effective” and “less effective” schools. Tuijnman and Postlethwaite (1994:35) confirm that based on the home backgrounds and achievement of learners it is possible to predict what the level of achievement of a school should be. Schools that perform better than the mean score are called “more effective schools” and those that perform at a lower level than what they should have obtained are called “less effective schools”. The “less effective” and “more effective” schools can then be compared to identify what the difference is in the variables or indicators of both sets of schools. This then means that learner attainment can be used as the basis to investigate factors which may be reasons for the variations thereof. For example one can use learner attainment and then look at the qualifications of educators to assess the influence of this factor on the performance of learners.

The most pertinent definition of school effectiveness to this study is one by Scheerens (2000:18) in which he describes school effectiveness as the performance or output of the school. Scheerens further explains that the performance of the school is measured by the average achievement of learners at the end of formal schooling. Scheerens (200:18-19) argues that in order to fairly compare schools one must assess the: “...added value of a period of schooling.” This means that the impact of schooling must be investigated when the achievement of learners is attributed to attending

school A rather than school B. This research attempts to investigate the variation of learner achievement in the Senior Certificate Examination, which essentially is the end of the period of formal education for learners in South Africa.

Motala (2003:16-17) suggests that the quantitative research on matriculation results is in keeping with the school effectiveness tradition. Motala (2003: 16-17) explains that researchers within this tradition tend to ask the question about the factors contributing to the high level of inter-school variance or distribution of the matriculation results. Motala further argues that the socio-economic position of students and levels of resources explain much of the variation in school performance. When comparing independent and public schools the issue of the resources of the school, as well as socio-economic status of learners, is bound to arise. Learners in independent schools pay higher school fees and may, therefore, be seen as “elitist” (Henning, 1993:14). Henning (1993:14) further indicates that if school fees are the only source of funding for the school then it is inevitable that independent schools will be sourced by wealthy families or those that are able to make sacrifices to pay fees. The researcher does not seek to establish the socio-economic status of learners from public or independent schools, but does investigate the effect of school fees on learner performance. This, however, can passively become an indicator for socio-economic status of learners.

(The use of the word ‘quality’ in this study is outlined in chapter 1). There is a difference in the investigation of quality and effective education. In citing the following table from Adam (1993) in (Jansen, 1995: 19) the difference between school quality and school effectiveness is highlighted:

Table 1: Comparison between school effectiveness and school quality

School Effectiveness	School Quality
(1) Origins in economics, using the production function	(1) Influenced in part by anthropology, descriptive procedures
(2) Studies the effects of a set of inputs (e.g. textbooks) on a specified output (e.g. student achievement)	(2) Studies school and classroom-level processes and their interaction and impact on achievement
(3) Utilizes large-scale statistical methods e.g. regression models to 'determine' the relative effects of different inputs on achievement	(3) Uses ethnographic instruments, adapted for particular contexts e.g. interviews, observation, schedules, questionnaires, etc.
(4) Results are often aggregated for a large number of schools offering generalisations across contexts	(4) Results often specified for particular schools or classrooms, though generalisations are also sought across schools and classrooms

Source: Adams (1993 in Jansen, 1995:19)

Table 1 provides an explanation as to why the researcher for this study is seeking to investigate the relative effectiveness of public and independent schools and not the difference in the quality of education. The major reasons with reference to the above table are that the researcher firstly uses quantitative research methods as well as aggregated data of all schools writing the national Senior Certificate Examination. The researcher aims to study the impact of type of school on learner achievement in the Senior Certificate Examination.

Postlethwaite (2004:11) contends that "(o)ne of the major changes in education systems in the past two decades is the measure of their relative quality through the assessment of their outcomes". He argues that a "good' school is defined by its outputs and not its inputs". What this translates into is that a good school is not necessarily a school which is well resourced in terms of the number of educators and quality of its facilities, but rather one in which the performance of learners is good, irrespective of the level of the inputs. The difference between public and independent schools on face value is that the independent schools have the funds to provide better resources. However, in using Postlethwaite's view, in order to assess which schooling sector is more

effective, it is necessary to assess the output which is learner performance rather than the difference in the inputs that may lead to better learner attainment. This is an important point in researching which sector provides more effective education as the basis of this research is that the more effective schooling sector is the one in which the learner achievement is better.

In South Africa learner performance in the Senior Certificate Examination has been one of the major indicators of the quality of education, as South Africa has few national examinations (especially in primary schools) to gauge the performance of learners in public and independent schools. The Third International Mathematics Survey (TIMSS) for Grade 8 and the national Grade 6 systemic evaluation also provided valuable information on how South African pupils performed at a national and international level. Other examples of international studies are those conducted by the Southern and Eastern Consortium for Monitoring Educational Quality (SACMEQ) between 1995 and 2002. South Africa also participates in PISA (Programme for International Student Assessment) which assesses the extent to which students near the end of compulsory education have acquired some of the knowledge and skills that are essential for full participation in society, and focuses on student competencies in the key subject areas of reading, mathematics and science (PISA, 2006). These tests provide valuable information about the performance of the education systems in various countries. The findings from PISA (2006:17), for example, were used to:

...gauge the knowledge and skills of learners in the country in comparison with those of the other participating countries; establish benchmarks for educational improvement, for example, in terms of the mean scores achieved by other countries or their capacity to provide high levels of equity in educational outcomes and opportunities; and understand relative strengths and weaknesses of their education systems.

This type of acknowledgment of the use of learner achievement in comparative studies is important in this study as the researcher uses the Senior Certificate Examination to compare the public and independent schooling sectors. The next section further explains the use of learner achievement in subjects such as Mathematics and Physical Science on benchmarking the performance of the education system as a whole.

2.2.2 The use of Mathematics and Physical Science Results in Effective Education

Hanushek *et al.* (2008) conducted research which explored the role of school attainment and cognitive skills in economic growth. Performance in Mathematics and Physical Science in Grade 12 was used to assess the average level of cognitive skills in a country. This information was then used to assess how human capital (defined in that study as performance in Mathematics and Science) related to the differences in economic growth between 1960 and 2000. This was done for 50 countries across the world and countries could then be classified as top, average or low performers. South Africa was classified as a low performer, together with countries such as Albania and the Philippines.

It is important that learners receive an education of acceptable quality in order for them to perform adequately in the work environment and become productive citizens. Although most of these studies define school quality in different ways, the common conclusion is that the standard of education received is an important factor in explaining the variations in the productivity of individuals. This evidence of the link between quality of education and productivity emphasises the importance of quality in education from an economic perspective. The Senior Certificate Examination represents the exit point for learners in South Africa after which learners either move into tertiary institutions or seek employment. The quality of the pass achieved in this examination therefore determines the future of the learners.

The National Strategy for Mathematics, Science and Technology (2001) emphasises the importance of Mathematics and Science as part of the human development strategy in South Africa. These subjects therefore became priority subjects in South African education. The National Strategy for Mathematics, Science and Technology Education (2001:7) further argues that Mathematics, Science and Technology are regarded as the subjects which contribute to successful schooling. The strategy describes these subjects or learning fields as indicators of the quality in the delivery of education. In this research report to ascertain which type of school is performing more effectively it is also important to investigate the pass rates in Mathematics and Physical Science.

Studies such as these will provide more accurate information about the use of quantitative data in assessing the effectiveness or quality of education in both the public and independent schooling sector provided that both sectors wrote the international tests at the appropriate grade. However, the intention behind these studies is to provide information to policy makers and managers in the education sector. Parents can also make use of this data to decide on whether the South African education system in a particular province is of an acceptable standard.

There are various reasons why parents may opt for public or independent schools and the debate of public versus independent schools is an ongoing one. The next section reviews some of the research conducted on public and independent schools and discusses some of the findings of these researchers.

2.2.3. Public versus Independent Schooling

The reasons for parents choosing public or independent schools may differ from country to country. However, the issue of effectiveness is bound to be a central reason for choosing one type of school over the other. A number of studies have been conducted in South Africa regarding the education in public and/ or independent schools. These studies include amongst others those by

Dieltiens (2003), Henning (1993) and Muller (1990). Internationally studies by Beavis (2004), The National Assessment of Education Progress (2006), Patrinos (2000), Jimenez, Lockheed and Paqueo (1991), Woodhall (2004), Péano (1997) and McEwan and Carnoy (2000) also shed light on the theme of this study. Whilst these studies may not discuss the effectiveness of education as a comparison between public and independent education, they do investigate the effectiveness of education in public or independent schools.

Henning (1993:44) who writes in the context of the South African education system argues that independent schools are more responsive to parents' needs due to the fees that are charged. He continues the point by adding that public schools offering good quality education therefore have nothing to fear from independent schools because they will always be cheaper. However, he points out that parents will compare the independent and public schools based on the quality of education provided. Henning (1993:11) also provides evidence in which he confirms that in 1992, twenty independent schools were listed amongst the one hundred best performing schools in South Africa based on their performance in the Senior Certificate Examination.

In the case study in South Africa which included public and independent schools Dieltiens (2003:8-12) concluded that there were independent schools that produced very good matriculation results as well as those schools that produced very poor results. Some of the reasons for those schools performing better were the quality of educators, a competitive academic environment and individual attention to learners, as well as the role of religion⁵ at some of the schools. Dieltiens (2003:18) further argues that the statistics comparing public and independent schools must also include the results from the Independent Examinations Board (IEB) whose examinations were undertaken by 134 independent schools in 2001 as it is recognized as a "high-quality" examining body. The results for the IEB examinations are not included in this study as it will not be relevant as a common indicator to compare the two sectors.

⁵ Dieltiens (2003:8-9) reveals that religion also plays a role in learner performance. He bases this argument on two religious-based schools a Muslim and Christian charismatic school which he argues provides a strict, disciplined environment for learning which is organised around religious principles.

However, it is necessary to inform the reader that learners in independent schools that do not write the national examination participate in the IEB examination.

Muller (1990:42) concludes that independent schools in South Africa can achieve better outcomes which are measured by the Senior Certificate Examinations only if high fees are charged; teachers are paid more, if they use an entrance test for learners and commit themselves to some other form of evaluation. Coleman, Hoffer and Kilgore (quoted in Muller, 1990: 70) also argue that independent schools definitely improve academic achievement. Learners in independent schools also perform better in Mathematics and vocabulary. The main reason for the difference in performance is usually learner backgrounds. However, Coleman, Hoffer and Kilgore argue that the difference in learner performance in public and independent schools persists even when background is controlled for. They argue that the reason for the difference is due to the conditions in which learners find themselves at the different types of schools. These may include issues of safety and discipline.

International researchers also conclude that the independent schools offer better educational standards than the public ones. Some of these studies emphasise that it is important to understand why parents choose public or independent education for their children. Beavis (2004), who conducted research in Australia on why parents send their children to independent schools, concluded that the main factors for parents choosing independent schooling include political persuasion (liberal or national party voters are more likely to send their children to independent schools), occupational status (families with higher occupational status), family educational levels (families with higher educational levels), family income (families with high income) and family socio-economic status (families with high socio-economic status). Parents who fell into these categories were more likely to send their children to independent schools.

Beavis (2004) also investigated the reasons for parent's confidence in the public schooling system. He concludes that 53 per cent of the parents

interviewed said that they would not change to an independent school if there were no additional costs. Some of the reasons cited were that parents had attended public schools with positive results, the quality of education was viewed as equal, and the variety of learner backgrounds and social diversity was viewed favourably. Thirty four per cent of parents who were given the same option said they would change to independent schools because the discipline was better, the education or educators were better and the classes were smaller.

The study by Patrinos (2000) is useful in its exploration of the benefits of independent schooling in the Netherlands, even though it reflects a socio-economic context that is not directly comparable to that of South Africa. The education system in the Netherlands has a substantial element of privatisation (Patrinos, 2000). The majority of students (70 per cent) attend independent schools run by independent education boards. Evaluations on the school system show that the Netherlands score high in international tests and there are positive reports on academic effectiveness, but these are without any significant inequities in the system. The Netherlands appears to be a good example of effective independent schooling and is worth further investigation as a comparative study.

The National Assessment of Education Progress (NAEP) in America is a project carried out nationally in America and provides objective information on learner performance which it distributes to policymakers at the national, state, and local levels. The NAEP forms an important component of the evaluation of the status and progress of education in America and provides information related to academic achievement and other relevant variables. The study is significant to this research as one of the reasons for conducting the research was the interest in the question of whether public and independent schools are equally effective in helping all children to learn. The study compared the difference in mean scores in the 2003 NAEP for reading and Mathematics scores of public and independent schools in Grade 4 and Grade 8. The study statistically controlled the following learner characteristics: "(gender, race/ethnicity, disability status, identification as an English language learner)

and school characteristics (such as school size, location, and the composition of the student body)". In Grades 4 and 8 for reading and Mathematics, using unadjusted mean scores, learners in independent schools scored significantly higher than learners in public schools. After adjusting the means⁶, the average for public schools was significantly higher than the average for independent schools for Grade 4 Mathematics and not significantly different for reading. For Grade 8, the average for independent schools was significantly higher than the average for public schools in reading, but not significantly different for Mathematics.

Other studies which were conducted in a similar manner was conducted by Jimenez, Lockheed and Paqueo (1991:205-218) who compared independent and public education in secondary education in Columbia, the Dominican Republic, the Philippines, Tanzania and Thailand and concluded that independent school learners outperform public school learners on standardized mathematics and language tests. The reason for this, they argue, is that there are incentives for independent schools to provide quality education because of the greater accountability to parents.

McEwan and Carnoy (2000) assessed the relative effectiveness and efficiency of independent and public schools in Chile. In Chile a voucher plan⁷ was implemented in 1980. The voucher system levels the playing field in terms of the choice between public and independent schooling making independent schooling more affordable to disadvantaged learners. McEwan and Carnoy (2000:213) argue that the voucher system was launched as a "solution to low-quality public education especially for disadvantaged children". This provided parents with a choice between public and independent schools, without the factor of cost. The study found that after comparing test scores in the for-profit

⁶ It is possible that students enrolled in the public and private schools differ on key characteristics that are associated with achievement. To the extent that is true, estimates of the average difference in achievement between school types will be confused with initial differences between their student populations. This is of special concern if measures of prior academic achievement are unavailable, as is the case in the NAEP report. One way of dealing with this problem is the statistical adjustment of scores in which these characteristics are controlled.

⁷ The voucher system occurs when all learners were allowed to enroll at either a public or a private school and these schools received a monthly payment from the government based on the number of students enrolled. The voucher was a flat rate per learner although there was some variation for poverty and geographical location.

schools, public schools, Catholic schools and elite schools the test scores in for-profit schools were equivalent to the public schools; the Catholic schools scored higher than public schools and the for-profit schools while the elite schools, which do not accept vouchers, scored the highest in test scores.

This section speaks generally about some of the different factors that impact the public versus independent schooling debate. Most of the research is based on the national statistics of different countries regarding public and independent schools. The research in most countries is based on the learner performance in various standardised tests. It is important to note is that in most countries the independent schools perform better on standardised tests than their public counterparts.

2.2.4 School Fees

The literature is also useful in its attention to the issue of school fees and how this relates to learner performance. Cost is an important factor that affects parents' decision on the type of school they want to send their children to. According to Dieltiens (2003:8), when comparing matriculation results for public and independent schools, the socio-economic status of learners is a reasonably good indicator of variation in performance. Dieltiens (2003:8) argues that there is a significant difference in the performance of schools charging higher and lower fees.

In this research report the researcher also investigates if there is a trend that schools that are charging higher fees produce better results as the fees paid by parents is a determining factor in the quality of education expected from schools.

Crouch and Mabogoane (1998: 3) concluded that the township location of schools affects the matriculation pass rate as these schools tend to have lower pass rates than schools in the other ex-Departments⁸. The fees charged in these schools are considerably lower, but Crouch and Mabogoane still conclude that even with more or less equal resources the performance of the previously disadvantaged schools was still lower than schools from the other ex-Departments. The question that may be asked here is whether more expensive education is necessarily providing more effective education. The independent schooling sector does charge higher fees, but this does not necessarily equal better performance in the Senior Certificate Examination. There are also public schools charging comparatively high fees so it is important to correlate the fees against the pass rate. The factor of school fees is one variable that may be used to distinguish better performing schools as the school fees may be linked to providing the resources at the schools.

This point is further confirmed by Fiske and Ladde (2003:15-18) who conducted a study in South Africa and who indicate that the amount of fees charged may affect the quality of education by allowing schools the opportunity to acquire additional resources such as educators which may improve learner performance. Further Fiske and Ladd argue that there may be direct and indirect effects of school fees on school quality. In a direct way in those public schools the charging of school fees may boost the resources provided by the government. These funds may be used to improve the quality of educators employed (Fiske and Ladd, 2003:15-16). The indirect effects on quality of education point to the evidence that school fees allowed former white schools to maintain the quality of education they had during the apartheid regime (Fiske and Ladd, 2003:17).

⁸ According to the data standards used in education, ex-Departments refer to the former education departments which existed in the apartheid era prior to 1994. These include different departments for the various "race" (or population) groups in South Africa. On the basis of the racial profile of the department, funds were allocated with the former white department receiving higher funds than the other departments. The departments were as follows (Headcount Report for 2006):

Ex-DET – ex-Department of Education and Training (for Black South Africans);

Ex- HOD – ex-House of Delegates (for Indian South Africans);

Ex-HOR – ex-House of Representatives (for Coloured South Africans); and

Ex-TED – ex-Transvaal Education Department (for White South Africans in one of the four former provinces of the country).

Woodhall (2004:8-10) argues that although education is recognized throughout the world as an investment in human capital, which has a positive influence on the economic growth of a country, the expenditure of any country on education needs to be carefully substantiated as it is in competition with all other forms of national investment. According to Woodhall (2004:10) the principal question concerns the relationship between the costs and benefits of education when viewed as a social or independent form of investment. Péano (1997:64–65) argues that there is an eternal debate about whether independent schools are more cost-efficient and cost-effective than public ones. Further Péano cautions that one must be careful when qualifying which sector is 'better' because it is not easy to relate cost-efficiency to learner performance. Péano (1997:66) confirms that when a choice exists between either public or independent schools the type of school is correlated with various measures of school quality. With regards to this choice Péano (1997:66) concludes that using the theory of rates of return in other words the ratio of quality of education gained relative to the amount of money invested (school fees paid) :

...parents will choose the schools which guarantee higher private rates of return in relation to expenses borne by them; in other words the one with better quality/price ratio.

2.2.5 The Learner-to-educator ratio (LER)

The learner-to-educator ratio is another pertinent aspect of the literature on factors that affect the quality of learning.

Fisk and Ladd (2003:17) concluded that schools with more state-funded educators or higher qualified educators produce better educational outcomes than schools that have higher educator ratios or less qualified educators. Furthermore, Fisk and Ladd (2003-17) also concluded that the lower LERs the better the performance of learners.

In terms of redress in 1994, the GDE initially inherited large inequities with regard to LER or class sizes of over 60:1 in the public sector. It has decreased considerably over the past 12 years to 38:1 in 2006. The LER is one of the most common indicators used by the Department in planning and measuring the teaching and learning process, especially in the measurement of equity. It can also be used to measure the level of input in terms of human resources into education (GDE Annual Report, 2006: 36).

Educators are crucial resources in the learning process. The number of learners per educator in a classroom contributes directly to the individual attention an educator is able to give each child. In 2006 there were 57 675 educators employed in the ordinary schools in Gauteng of which 10 318 were in independent schools and 5 988 were employed by school governing bodies. Although the learner-to-educator ratio of former disadvantaged schools have improved, schools charging fees are able to lower educator ratios by employing additional educators (OECD, 2008:22-23). Further the report OECD on South African policy comments that the “return to investment” in teacher education or the performance of learners in return for the money spent on the training of educators is low. The report by the OECD (2008) argues that although there are improvements to the qualifications of educators, many are not sufficiently prepared to teach the grades assigned to them. Many educators come late to school, leave early, do not provide feedback on learners’ homework and spend much time on administrative tasks. If the government’s aspirations for a high-quality education system are to be realised then it would have to rely on the most significant agency which is the teaching force (OECD, 2008: 294) If this is the perception of the educators in South Africa then it is important to correlate the performance of learners not only to the LER but also to the qualification, training and experience of educators. However, this research report is limiting in correlating all the factors surrounding the quality of educators in public and independent schools. This may require more qualitative analysis of a case study taking a smaller sample of schools from both sectors. This research concentrates on quantitative data available for both sectors. Learner-to-

educator ratio therefore is an important indicator of the most important input in education which is educators.

The literature survey has highlighted the themes which are pertinent to this study. However, there is not an abundance of literature, especially in the South African context. The researcher, therefore, hopes to make a notable contribution to research regarding the effectiveness of public and independent education, with particular reference to Gauteng.

2.3 REVIEW OF POLICY DOCUMENTS

In a review of national education policies in South Africa in 2008 the Organisation for Economic Co-operation and Development (OECD) confirmed that the debates on the effectiveness of education policy since 1994 revolves around whether policy is not ambitious due to irrelevant emphasis on redress or due to the policy not being practical in view of the historical and economic limitations. The quality of education may be affected by a more integrated qualifications framework, a more relevant curriculum, better educators , increased financing and improved governance (OECD, 2008:93). This section describes those policies that are implemented to improve and monitor the effectiveness or quality of education in South Africa. The researcher chose policies that enhance the background of this study.

In order to gauge the extent to which policy documents refer to the effectiveness or quality of education, the researcher studied various policy documents. In the review of South African policy, the conclusion is made that in South Africa the levels of achievement of learners is not proportionate to the financial investment being made (OECD, 2008). This conclusion is based on findings from both international and national measures of learner achievement. The effectiveness of education is a product of the inputs and practices of education. In order to place the effectiveness of education in the correct context it is important to begin the policy review with the Constitution of South Africa as well as to emphasise the right of any individual to establish an independent school. Some of the barriers to quality education are to be

found in the area of education financing (OECD, 2008:95). It was therefore necessary to mention the Amended Norms and Standards for School Funding (2006) which outlines the conditions of funding independent schools. In terms of monitoring the quality of education the National Education Policy Act No. 27 of 1996 and General and Further Education and Training Quality Assurance Act No. 58 of 2001 are discussed.

The Constitution of the Republic of South Africa, Act 108 of 1996, provides the overall framework for the delivery of education. The Bill of Rights in the Constitution of the Republic of South Africa, 1996 Act No. 108 of 1996 recognizes that every person has the right to a basic education, which the state must make available. The Constitution also empowers the Provincial Education Departments to put into place their own legislation in order to ensure efficient service delivery within the provinces. Public education is the most effective means for the government to deliver on the mandate. However, the Constitution also offers people the choice not to use public education and provides for the establishment of independent schools.

The Constitution allows any person the right to establish and maintain an independent school at his or her own cost. The independent school must, however, comply with Section 9 (4) of the Constitution of 1996, which states that the institution must be registered with the state and maintain standards that are not inferior to that of public institutions. This statement suggests that independent institutions are benchmarked against public institutions in terms of quality. The extent to which this comparison must take place is not stipulated.

The independent schools are acknowledged in the Ammended National Norms and Standards for School Funding, Paragraph 54 as performing: "...a service to their learners that would otherwise be performed by the Provincial Education Departments."

The independent schools have to follow certain regulations which are designed to ensure that the quality of education is maintained. Independent schools receive subsidies from the state, which are calculated as a defined

fraction of the cost per learner in the public school system. However, the subsidies are subject to certain requirements on the part of independent schools. In terms of Paragraph 177 of the Ammended Norms and Standards for School Funding, 2006, requirements for independent subsidised schools include that:

- (a) its final grade 12 pass rate is 50% or more of full-time candidates writing the examination in the prior year ;*
- (b) not more than 20% of Grade 11 learners are repeaters who took Grade 11 in the same school during the previous year;*
- (c) not more than 20% of Grade 12 learners are repeaters who took Grade 12 in the same school during the previous year;*
- and*
- (d) it does not engage in practices that are calculated to artificially increase the school's grade 12 pass rate.*

In terms of the National Education Policy Act No. 27 of 1996, the Minister of Education is required to monitor and evaluate the standards of education provision, delivery and performance, to a large extent through the use of education statistics. These statistics are mainly in the form of quantitative data collected through surveys. The performance of the education system is dependent on the performance of learners.

Amongst the objectives of the General and Further Education and Training Quality Assurance Act No. 58 of 2001 is the need to establish a quality assurance body to ensure that the continuous enhancement of quality is achieved in the delivery and outcomes of the general and further education and training sectors of the national education and training systems, and also to develop a quality assurance framework for the general and further education bands of the National Qualifications Framework. With reference to this act, the Gauteng Department of Education has established the Directorate: Quality Assurance to monitor and evaluate educational standards and to promote quality. A Provincial Quality Assurance Committee was launched and amongst the terms of reference of this committee is the need to

develop a strategy to promote the objectives of the Act. The most important indicator of quality in terms of the Act is learner performance.

2.4 SUMMARY

In this chapter the researcher focused on a literature review in terms of school effectiveness, the debate on public and independent education, the importance of performance in Mathematics and Physical Science, school fees and learner-to-educator ratio. The relevant policy referring to the effectiveness or quality of public and independent schools was also explored. The literature study in this chapter formed a framework for the empirical study. The chapter outlined the literature relevant to investigate whether the public or independent schooling sector provides more effective education.

The literature on school effectiveness highlights how the term is defined by various researchers in the context of this research. The literature suggests that 'effectiveness' is measured by learner performance in tests or examinations. The debate on public and independent schools is an ongoing one and as the independent sector grows this may be seen as a threat to the role of the government to provide quality education. As Dieltiens (2003: 3) explains:

...as long as there are inefficiencies in public education in terms of access and quality, private schools are seen to act as a pressure valve, helping to plug gaps which state provision is unable to fill.

An attempt was also made to establish the importance of two factors that influence the provision of effective education, namely school fees and learner-to-educator ratio.

In the next chapter the research methodology and the approach regarding the quantitative data analysis are provided.

CHAPTER 3 RESEARCH METHODOLOGY

3.1 INTRODUCTION

Against the background of the literature survey in chapter 2, this chapter outlines the research design used by the researcher to collect data and also focuses on the methodology. The researcher collected quantitative data on the Senior Certificate Examination results as well as data from other surveys such as the annual Headcount Survey conducted by the Education Management Information Systems unit of the Gauteng Department of Education. For the quantitative techniques the instruments are the matriculation results for the years 2002 and 2006. The results are the actual marks obtained by the candidates in the independent and public sector. The results are presented as actual number or percentages.

3.2 RESEARCH DESIGN

Section 3.2 outlines the research design or the structure of the research. The structure follows the following format. First the purpose of quantitative research is explained as this is the only method used in the research report and the researcher needs to qualify the use of this method. The use of trend data is then explained as the researcher uses multi-year analysis in order to establish a trend or pattern in the findings in the years 2002 to 2006.

3.2.1 The purpose of quantitative research

Leedy and Ormrod (2001:101) explain that the purpose of quantitative research is to identify explanations and predictions that will be generalized to apply to other persons and places. It involves either identifying the characteristic of an observed phenomenon or exploring the possible correlations among two or more phenomenon. Further, Leedy and Ormrod (2001:101-102) indicate that quantitative research is used to answer questions about relationships among measured variables in order to explain, predict and control phenomena. Researchers using this type of research

usually start with specific hypotheses that need to be tested. The variable to be tested is isolated, controlled for irrelevant variables, a standardized procedure is used to collect numerical data and statistical methods are used to analyse and draw conclusions from the data (Leedy and Ormrod, 2001: 101-102).

Gall *et al.* (1996:767) define quantitative research as an inquiry that is based on the assumption that characteristics of the social environment consist of an objective reality that remains constant over time and settings which can be measured with numbers and analysed with statistical procedures in order to test whether the generalizations of the theory hold true.

Leedy *et al.* (2001:102) further emphasize that quantitative researchers choose methods that allow them to be as objective as possible when measuring and analyzing the variable under study. The data collection involves identifying one or a few variables that will be studied and then collecting data related to those variables. Data are collected from a population or one or more large samples representative of the population and in a form that is easily converted to numbers.

Quantitative research designs are either descriptive (subjects usually measured once) or experimental (subjects measured before and after a treatment). Black (1999:46) describes descriptive statistics as the collection of quantitative data but the presentation of such data will be descriptive, that is in the form of graphs and charts. This study involves the presentation of descriptive statistics when analyzing and comparing the matriculation pass rates over the period 2002 to 2006. Gall *et al.* (1996:375-376) identified several types of measures for descriptive statistics in education. These include standardized achievement tests, classroom observation instruments, attitude scales and interview schedules.

The researcher begins by constructing a hypothesis and then draws certain logical conclusions. In this research report such statistical hypotheses will be used. Leedy *et al.* (2001: 6) defines a hypothesis as a logical assumption, a

reasonable or educated guess. The statistical hypotheses usually postulate the opposite of what the researcher predicts. In this form it represents a null hypothesis represented by the symbol H_0 .

If the researcher expects that there will be a significant difference between the pass rates in Senior Certificate Examination in public and independent schools (research hypothesis) then the hypothesis will be stated in the form of a null hypothesis. The null hypothesis is statistically tested. The null hypothesis will therefore be:

H_0 – the independent schooling sector provides more effective education than the public schooling sector in Gauteng.

The alternate hypothesis will read:

H_a – The independent schooling sector does not provide more effective education than the public schooling sector in Gauteng.

If once the analysis is done and it is concluded that the public schooling sector is more effective than the independent sector, then the null hypothesis (H_0) will be rejected and the alternate hypothesis (H_a) is accepted.

3.2.2. The use of trend data

Gall *et al.* (1996:375) identify two types of descriptive statistics which can be used in education: the first measuring the variable at one point in time and the second involving longitudinal research over a period of time. In this study the trends in performance of learners in the Senior Certificate Examination in public and independent schools is analysed using the entire population of matriculation learners writing the national Senior Certificate Examination between 2002 and 2006 in Gauteng. Farnum and Stanton (1989:151-154) argue that the value of a series may change over a period of time for various reasons such as population growth, technological improvements and other societal changes. If the change is over a long period of time and in one

direction (up or down) a trend occurs. Measuring trends in learner achievement is important to ensure that the data from the trend analysis reflect the changes in learner performance and not the changes in the assessment instruments and procedures (Tuijnman and Postlethwaite, 1994: 147-148). In this study the researcher uses only the pass rates of schools as the instrument as the assessment procedure as well as the curriculum for Grade 12 and method of testing have remained constant over the period of the study. Tuijnman and Postlethwaite (1994: 149) argue that if assessments or curriculum are changed dramatically trends cannot be measured as the links to the past instruments and assessments will have to be established.

Zwick (1992 in Tuijnman and Postlethwaite, 1994:219) identifies five categories of change that can be used to measure trends in education. One of these is useful if the "goal is to support valid inferences about academic achievement measured against a standard". Zwick (1992) further provides an example of students' Mathematics results for Grades 4, 8 and 12 for the years 1992 and 1990. According to Tuijnman and Postlethwaite (1994:221) the bigger the measurement point in time the better the change can be measured.

In this research report, the researcher therefore uses data over the period of five years (2002 to 2006). The data observed over the five years in this study may reveal a trend in the performance of Grade 12 learners in public and independent schools. To increase the accuracy of the results the research was drawn from five consecutive years. This reduces irrelevant or external factors which may have influenced the performance of learners in one year.

3.3. RESEARCH METHODOLOGY

This section of the research report describes the research methodology employed as well as methods used for sampling, data collection, coding and cleaning, as well as data analysis.

3.3.1 Sampling

A census occurs when information is collected from all schools in the country (Tuijnman and Postlethwaite, 1994:38). This research surveyed the entire population of public and independent school learners that wrote the national Senior Certificate Examination between 2002 and 2006 in Gauteng and can therefore be considered a census. Leedy and Ormrod (2001: 221) argue that "...the larger the sample the better" and that when dealing with populations that are less than one hundred it is better to survey the entire population. Although the population in this study is more than one hundred, schools cannot be excluded as this will affect the overall provincial pass rates and a comparative study will be based on these pass rates. Crouch and Mabogoane (1998:3) point out that in order for any serious system of quality assessment to be done, it is important to use census-type examination. Table 2 indicates the number of learners and schools involved in the Senior Certificate Examinations in the period 2002 to 2006. The number of institutions varies between 2002 and 2006 due to new schools which opened during the period and others which closed down.

In this study the subjects are all learners and schools who wrote the Senior Certificate Examinations between 2002 and 2006 in public and independent schools. The data are disaggregated according to the type of school with regards to the school's relation with the state, namely:

- Public (PU)
- Independent (IN)
- Independent Subsidised (IS)

The independent sector is disaggregated into independent (schools that do not receive a government subsidy) and independent subsidised (schools that receive government subsidies).

Inspection of table 2 reveals that the number of learners writing the Senior Certificate Examination fluctuates slightly in all three sectors. The table reflects that the largest number of learners and institutions are in the public

sector, followed by the independent subsidized schools and lastly the independent schools. Table 2 represents only learners in ordinary schools and it excludes Learners with Special Education Needs (LSEN) as well as institutions that are not classified as independent, independent subsidised or public schools. This total of learners will, therefore, not reconcile to analysis on national or provincial matriculation results which do not classify data according to these categories.

Table 2: Number of Learners and Schools (by type of school) involved in the Senior Certificate Examinations between 2002 and 2006

Year	Independent		Independent Subsidised		Public	
	Learners	Schools	Learners	Schools	Learners	Schools
2002	2129	40	3710	96	58965	477
2003	2043	38	3701	98	61381	477
2004	1920	41	3653	98	64624	479
2005	1837	45	3564	95	68014	483
2006	2058	43	4091	95	65686	484

Calculations by Pillay using Examinations database from EMIS for 2002 to 2006

3.3.2 Instruments

Instruments are tools which are used to gather data. Leedy and Ormrod (2001:98) argue that instruments may be a survey to assess people's opinions, a test to measure what pupils have learnt or a checklist to evaluate the quality of a new product. The instruments in this report are the matriculation results for the years 2002 and 2006. The results are the actual marks obtained by the candidates in the independent and public sector. The results are presented as actual numbers or percentages.

The reason for choosing data from 2002 to 2006 is the issue of data compatibility - due to the type of data that were collected in previous years the researcher may not be able to aggregate the data in order to make it comparable to the data from 2002 onwards. The use of data prior to 2002 may, therefore, compromise the integrity of the data analysis.

The purpose of this research is to assess the effectiveness of the public and independent schooling system in Gauteng using the Senior Certificate

Examination as the output, indicator or measure. It is important to use a common indicator for both schooling sectors in order for a comparison to be done. The results of the Senior Certificate Examinations are readily available from the GDE and at present represent the only common assessment for public and independent schools.

3.3.3 Data collection

Data were obtained from the Education Management Information Systems (EMIS) unit of the Gauteng Department of Education. Data were already captured onto databases in MS-Excel. The database contained the examination information for 2002 and 2006. This included the pass rates for all public and independent institutions (overall pass rates and subject pass rates). As the examinations data are captured on MS-Excel spreadsheets. It was necessary for the researcher to import these data into MS-Access as this made multi-year analyses easier. The researcher chose the relevant tables and then produced a database in MS-Access for the analysis of the research called Research Report mdb. All data queries were validated and signed off by the GDE-Director of Education Planning, Reporting and Evaluation, Mr Sujee. The statistical analyses were validated by Dr Michael Muller from the University of the Witwatersrand.

3.3.4 Data Coding and entry

As the data used were captured by the EMIS unit data coding was done according to the national norms and standards for education information. The researcher, therefore, did not recode data but used the descriptive data table which already existed in the databases for each of the years. For example, data for the three categories of schools exist in the field called "Relation with State" and was coded as PU – public schools, IN – Independent schools and IS – Independent Subsidised schools. A "Master" table also existed which can be used to disaggregate data according to, for example relation with state, and type of institutions. Codes also exist for the various subjects. For the purpose of this study only Mathematics and Physical Science codes are relevant.

3.3.5 Scanning and cleaning of data

Data for the various years were obtained from the Examinations and Assessment Directorate in the Gauteng Department of Education and were presented in different worksheets in MS-Excel. The worksheets occur in A (Full Time) and B (Part Time) files which represent full-time and part-time candidates only. Only full-time students (A Files) were used as these students are registered at either public or independent schools. The data were checked by the researcher using queries in MS-Access for missing values as well as outliers. The examination data were cleaned and verified by the Examinations and Assessment Directorate in the GDE for all the relevant years.

Data were not captured by the researcher so the reliance on third party data had certain advantages and disadvantages. The advantage was that capture errors were limited as this can seriously distort the results. The disadvantage was that errors that were discovered in the data took longer to correct as the corrections could not be made without the permission of the EMIS unit.

Data in Access are easier to clean as the software can be preset to accept only data in the correct format – for example, values within a given range which then minimises errors in capturing. Queries were run for nominal or ordinal variables which count the number of responses in each category. Erroneous entries were easily identified. For example, there were null responses and capture errors such as numbers that were out of range.

Basic descriptive statistics were performed for all interval variables. Performing a query in which the data were sorted according to the maximum and minimum immediately identified data that were impossible, for example a pass rate of over 100 per cent or an LER of 239:1. Errors were identified and corrected.

3.3.6 Organising the data

The data for the years 2002 to 2006 occurred in two different data files. The first data file contained data per centre or school and the second data file contained the symbol distribution of all learners in each subject. The data per centre were exported to SPSS for Windows, a statistical software package. This allowed for more advanced data analysis and statistical model building. The second file containing the symbol distribution of learners per subject was analysed directly in MS-Access.

3.3.7 Definition of variables

For the analysis the following variables were specified:

- The year under consideration (2002 to 2006)
- Overall percentage pass rate achieved by a school
- The type of school (public, independent and independent subsidised)
- The school fees charged by the school
- Learner-to-educator ratio describes the number of learners per educator

3.3.8 Data analysis techniques employed

Ultimately, all research culminates in the analysis and interpretation of some set of data. In order to gain an understanding of the variation in the data and possible relationships that could be tested for statistical significance, the analysis followed a multiple step approach.

The first step involved studying the statistical distribution of pass rates, which given the research objectives of this study, were considered as study or dependent variable. Histograms of the pass rates were produced for each year. These were considered an important phase of the data analysis, as it guided the researcher in choosing the correct statistical data analysis techniques. Statistical analysis techniques such as t-tests or ANOVA tests require data that are considered normally distributed or having an underlying normal distribution. If data are not normally distributed (skewed), a descriptive

statistic such as the mean might not be the best descriptor for central tendency. In such a case the analysis should revert to using nonparametric or distribution free test statistics such as Mann-Whitney U test or Kruskal-Wallis H test.

The second step in the analysis involved testing for statistical significant differences in the distributions of pass rates by school type (public, independent and independent subsidised).

The third step in the analysis involved correlation analysis. Correlation designs are established on pairs of measures or scores of a single sample in order to determine the strength of the linear relationship between two variables that represent the characteristic of or performance by the group (Black, 1999: 21-22). It is the study of the relationship between two or more variables on a single subject. For this study the Pearson Product Moment Correlation was calculated. Black (1999:627) describes this model as the most commonly used to investigate the possible relationships between measures of traits, abilities and characteristics. In this report the Pearson Correlation is used to determine the linear relationship between matriculation pass rates, school fees as well as learner-to-educator ratio.

For correlation, the relationship between variables is symbolised by the correlation coefficient and noted by the symbol “r”. The correlation coefficient measures the linear strength and direction of the relationship between two continuous variables. If r is close to 1, it means that a strong positive linear relationship exists. In other words, as one variable increases so does the other. If $r=1$ then the points would be represented by a straight line. Values close to -1 suggests a strong negative linear relationship. As one variable increases the other decreases. Non-existent linear relationships exist when $r = 0$ (Black, 1999:625-627).

The last step in the analysis involved multiple linear regression. This technique is an inferential statistical procedure. According to Black (1999:670) multiple regression is used to determine the relationship between a dependent

scale variable (for example pass rate) and more than one independent variable (for example learner-to-educator ratio, fees and type of school). The advantage of using multiple regression is that it helps clarify the dependent variable and the independent variable so that an understanding between the response variable (Y) and predictor variable (X) is developed (Lewis-Beck, 1993: 39). Further Lewis-Beck (1993:39) explains that multiple regression is a technique with far reaching range and can, therefore, be used to analyse most quantitative data.

This research method was decided upon because it is best suited to answer the research questions. According to Gall *et al.* (1996:433) multiple regression is one of the most widely used statistical techniques in educational research as it is versatile and yields a vast amount of information about the relationships among variables. Further Gall *et al.* argue that it provides estimation on the statistical significance of the relationships between variables. For the purpose of this paper the researcher is interested in maximising the variance in learner performance in public and independent schools. The causal factors that explain learner performance are not important for this research. Therefore, in order to create a fuller explanation of performance, multiple regression will be used.

The relationship in a multiple regression model is represented by the statistical equation:

$$y = c + b_1x_1 + b_2x_2 + \dots b_kx_k + e$$

where y = dependent variable

x_i = independent variables

b_i = coefficients

e = error

In this study the researcher hypothesised that the matriculation pass rate is influenced (amongst other) by three factors, namely (1) the amount of school fees paid; (2) the Learner-to-Educator Ratio and (3) the type of school

(independent, public or subsidised). Learner performance (as measured by the pass rate) is the dependent variable (y variable) and the independent variables are the LER, school fees and type of school (x variables). This equation can therefore, be used to predict the matriculation pass rate (y) for pairs of values of school fees (x_1), LER (x_2) and type of school (x_3 and x_4). Because the type of school is classified into three categories, two dummy variables (x_3 and x_4) were created to represent the various categories.

	X_3	X_4
PU	1	0
IN	0	1
IS	0	0

For the regression analysis, the following three basic assumptions were made:

- All independent schools writing the provincial or national examinations were included in the study over the period 2002 and 2006. This is the only common indicator of learner performance or output from both the public and independent sector during this time.
- There are other variables that influence learner performance such as resources, teacher qualifications etc which are not considered as the scope of this study.
- The school fees of each school are correct as reflected by schools on the survey.

The results of the analyses are presented in chapter 4.

3.3.9 Presentation of results

Once the data were analysed, results are presented in the form of tables and graphs.

3.3.10 Definition of statistical and technical concepts

The following statistical and technical concepts are pertinent to the data analysis that was undertaken:

- **Overall/Average Pass rate**

To calculate the overall pass rates for independent, independent subsidised and public schools the total number of learners passed was divided by the total number of learners who wrote and multiplied by a hundred.

- **Pass Rate per subject (Mathematics and Physical Science)**

This was determined by dividing the total number of learners who passed the subject by the total number who wrote the subject and then multiplying by a hundred.

- **Percentage endorsement rate**

This was determined by dividing the number of learners who passed with endorsement by the total number of learners who wrote for endorsement and then multiplying by a hundred.

- **Percentage distinctions in Mathematics and Physical Science**

The number of learners who passed the subject with distinction was divided by the total number of learners who wrote the subject and then multiplied by a hundred.

3.3.11 Reliability and Validity of the Research Instrument

Reliability

Leedy and Ormrod (2001:31) define reliability as the consistency with which an instrument produces a certain result when a given entity is being measured under near-identical conditions.

Validity

According to Leedy and Ormrod (2001:98) validity can be described as the degree to which the instrument measures what it intended to measure. They further explain that validity takes different forms depending on the situation in question; these include face, content, criterion and construct validity. For the purpose of this research report two types of validity will be discussed, namely content validity and criterion validity.

Content Validity refers to the extent to which an instrument is a representative sample of the content being measured. It is often used to assess people's achievement in an area for example what they have learnt during a lesson in the classroom (Leedy and Ormrod, 2001: 98). In the context of this study the matriculation results are used to compare the effectiveness of education in public and independent schools. The Grade 12 examinations are standardised by the National Department of Education. The competency or performance of learners in the examination is evidence that the content and syllabus in various subjects was adequately covered.

Criterion validity refers to the extent to which the results of an assessment instrument correlate with another measure which is probably related. The latter measure is called the criterion (Leedy and Ormrod, 2001: 98). In this study matriculation results are used to measure the effectiveness of the two types of schools. The matriculation results are also correlated to school fees and learner-to-educator ratios to establish the relationship between the results and these factors.

The instruments used in this study are therefore considered to be valid for this investigation. The validity in terms of content and standard of the examination is determined by a panel of matriculation examiners, internal and external moderators who are knowledgeable in their field of study.

3.4. SUMMARY

In this chapter the researcher provided the empirical design by discussing the research design and research methods used. With regards to the research design the researcher motivated the reason for using quantitative research and the use of trend data in this study is discussed. The research methodology outlined the sampling techniques used, the instruments, data collection processes, coding of data, the cleaning of data, organising and presenting of data. A definition of the statistical and technical concepts was also provided. Lastly the issue of reliability and validity was discussed. This chapter places in context all of the analysis done in chapter 4.

In the next chapter the data analysis and interpretation thereof are presented.

CHAPTER 4

DATA ANALYSIS AND INTERPRETATION OF DATA

4.1. INTRODUCTION

In chapter 3 the focus was on the research design, the research instrument and methodology used in relation to this investigation. The researcher also explained how correlation and multiple regression will be used to explore the relationship between learner performances, school fees, learner-to-educator ratio and type of school.

In this chapter the analysis of data, as well the research findings are presented. The appropriate data will be analysed, interpreted and presented by using graphs and tables. A discussion for each of the illustrations used will follow. An analysis of the relationship between the matriculation pass rates, school fees, learner-to-educator ratios and type of schools using correlation and multiple regression was also performed.

The procedure followed in the analysis of the data is outlined before the data are presented in the form of graphs and tables.

4.2. RESULTS

4.2.1 Number and percentage of endorsements

It is important to understand what the requirements for a matriculation endorsement or exemption are before providing the findings on these. A summary of the requirements for matriculation endorsement or exemption is provided by the Matriculation Board of South Africa (2005) as indicated below:

Endorsements

Subject grouping

The subject grouping for selection of senior certificate subjects is as follows:

GROUP A: First and Second Languages Higher Grade (the eleven official languages at first language Higher Grade as well as second language Higher Grade level).

GROUP B: Mathematics Higher Grade and Standard Grade.

GROUP C: Natural Sciences Higher Grade and Standard Grade (Physical Science, Biology and Physiology).

GROUP D: Third Languages Higher Grade and Standard Grade including Second Languages Higher Grade from Group A offered as third languages for this group.

GROUP E: Human Sciences Higher Grade and Standard Grade (Biblical Studies, Economics, Geography, History and Jewish Studies).

GROUP F: Geography (if not presented for the purposes of Group E), Accounting, Additional Mathematics, Agricultural Science, Animal Husbandry, Art, Business Economics, Computer Studies, Dance, Home Economics, Music, Technical Drawing, Technika (four divisions), Speech and Drama Higher Grade and Standard Grade and a substantial number of subjects only offered on the Standard Grade.

a. Full-time Candidates

- *Take six approved subjects*
- *Pass five of these subjects and obtain at least 20% in the sixth*
- *Take four HG subjects including two official languages at first & second language HG level and one of which must be a university language of instruction*

- *In addition to the official languages, take subjects from three of Groups B to F*
- *In addition to Group A, pass HG subjects from two of Groups B to F*
- *Meet the aggregate requirements of 950 (45 %+) at one examination sitting.*

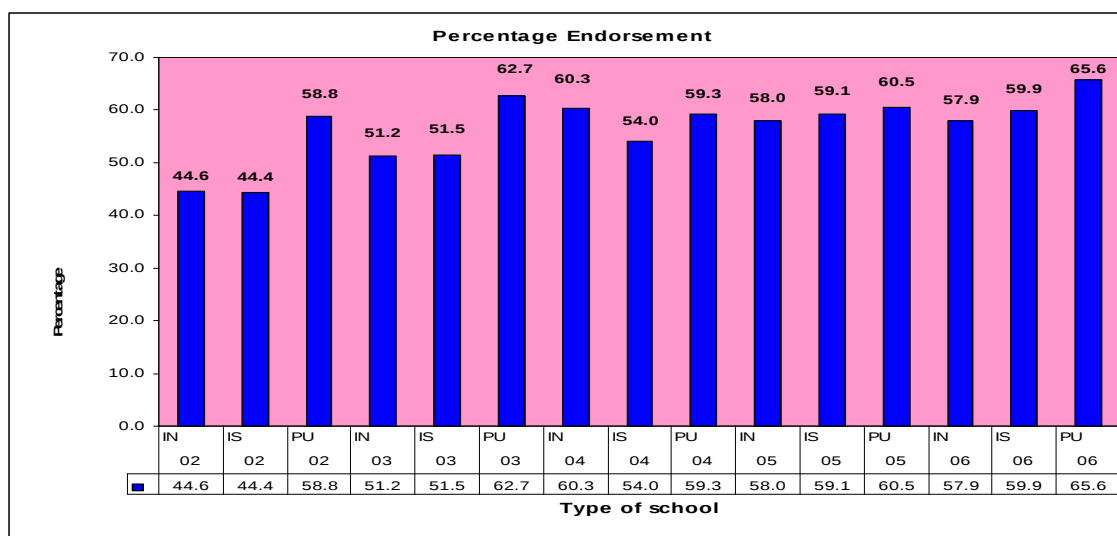
It is important when comparing quality to establish the number of learners who wrote for exemption or matriculation endorsement as this represents the better quality pass rate. This means they have to pass certain subjects at a certain level as indicated above. Learners who want to go on to higher education will in most cases need to get a Matriculation Endorsement or Matriculation Exemption. Universities have a points system in place which means that learners are awarded a certain number of points according to their final matriculation marks. Different courses require more or fewer points. Sometimes a higher pass rate can be masked in the fact that most of the candidates wrote for a senior certificate. It is therefore important to establish the number of learners who wrote for matriculation endorsements as well as the number writing for senior certificates as illustrated in table 3. From table 3 it can be seen that the number of learners writing for endorsements fluctuated slightly in all sectors over the five years. What is evident from table 3 is that over 50 per cent of learners in every sector over the five years were writing for senior certificates. This does not contribute positively to the quality of the majority of the pass rates in the senior certificate examinations.

Table 3: Number of Learners who wrote for endorsement and senior certificate

Year	Relation with State	Total wrote endorsement	Total Wrote Senior Certificate	Total Wrote
2002	IN	1020	1109	2129
2002	IS	1779	1931	3710
2002	PU	21791	37174	58965
2003	IN	1018	1025	2043
2003	IS	1770	1931	3701
2003	PU	22737	38644	61381
2004	IN	895	1025	1920
2004	IS	1697	1956	3653
2004	PU	23718	40906	64624
2005	IN	928	909	1837
2005	IS	1745	1819	3564
2005	PU	22491	45523	68014
2006	IN	1047	1011	2058
2006	IS	2065	2026	4091
2006	PU	22706	42980	65686

Calculations by Pillay using Examinations database from EMIS for 2002 to 2006
 IN – Independent Schools, IS – Independent Subsidised Schools, PU – Public Schools

Figure 2: Percentage Endorsement



Calculations by Pillay using Examinations database from EMIS for 2002 to 2006
 IN – Independent Schools, IS – Independent Subsidised Schools, PU – Public Schools

Figure 2 indicates the percentage of learners who wrote for and passed with endorsement or exemption. This was calculated by dividing the number of learners who passed with endorsement over the total number of learners who wrote for endorsement multiplied by 100. The highest percentage of learners who passed with exemption consistently over the five years in the three sectors is the learners in public schools. In 2006, 66 per cent of the learners in public schools who wrote for matriculation endorsement passed which is an improvement from the 59% in 2002.

From the graph in figure 2 it is evident that the public sector produces the highest percentage of endorsements across the three sectors. There are significant differences in the public sector and the other two sectors' percentage endorsements in 2002, 2003 and 2006.

4.2.2 Pass rates in Mathematics and Physical Science

The importance of the performance in Mathematics and Physical Science is universal as previously indicated in Chapter 2 by the study conducted by Hanushek *et al.* (2008).

The number of learners who participated in and successfully passed Mathematics and Physical Science between 2002 and 2006 in Grade 12 is illustrated in table 4. When comparing the Mathematics Higher Grade (HG) and Standard Grade (SG) results for the three types of schools it can be seen that the highest pass rates were obtained by the public and independent sectors which range from 71 to 79 per cent over the five years for both types of schools. The pass rates in the independent subsidised schools were considerably lower over the five years. It was also interesting to note that the majority of learners writing Mathematics in all three sectors wrote on the standard grade. The pass rates for Mathematics (SG) were between 45 and 61 per cent in all three sectors over the five years. The pass rates were not consistent in terms of which type of schools produced the highest pass rates.

The percentage pass rate for Physical Science follows the same trend. The public sector obtained the highest pass rates for three of the five years for Physical Science (HG) followed by the independent schools. The pass rates in public schools dropped in 2004 but increased from 67 to 70 per cent between 2002 and 2006. The independent schools pass rates decreased in 2006 but increased steadily from 54 per cent to 70 per cent between 2002 to 2005. Once again it must be noted that the majority of learners that wrote Physical Science did so on the standard grade in all three types of schools. The Physical Science (SG) pass rates in all three types of schools range between 50 and 66 per cent over the five years. The highest pass rates for three out of the five years are experienced by the independent subsidised schools (between 60 and 66 per cent). The public schools had the highest pass rate in 2002 and 2003 after which the pass rates declined. The pass rate in the independent schools fluctuated between 2002 and 2006 (on the level of between 48 and 50 per cent).

Table 4: Percentage Pass in Mathematics and Physical Science: Higher Grade and Standard Grade

			2002			2003			2004			2005			2006		
Subject	Grade	Sector	Wrote	Pass	%	Wrote	Pass	%	Wrote	Pass	%	Wrote	Pass	%	Wrote	Pass	%
Mathematics	HG	IN	353	250	71	333	263	79	350	262	75	332	262	79	406	306	75
	HG	IS	526	288	55	541	352	65	571	353	62	535	391	73	695	407	59
	HG	PU	7480	5453	73	7945	5935	75	8105	5793	71	8239	6524	79	8161	6065	74
Mathematics	SG	IN	1119	503	45	958	448	47	922	524	57	907	543	60	964	472	49
	SG	IS	1803	951	53	1759	985	56	1766	1015	57	1842	1127	61	2015	1133	56
	SG	PU	30229	16075	53	30005	15880	53	31716	16195	51	36494	17827	49	35197	16337	46
Physical Science	HG	IN	371	201	54	323	202	63	349	230	66	323	225	70	407	264	65
	HG	IS	666	320	48	655	346	53	572	342	60	567	379	67	704	420	60
	HG	PU	8934	5992	67	9304	6313	68	9509	6076	64	10266	7094	69	10044	7006	70
Physical Science	SG	IN	573	286	50	573	286	50	430	221	51	459	212	46	494	236	48
	SG	IS	982	589	60	982	589	60	1052	630	60	1043	642	62	1050	691	66
	SG	PU	15233	9663	63	15233	9663	63	15606	8836	57	18623	9571	51	18135	10025	55

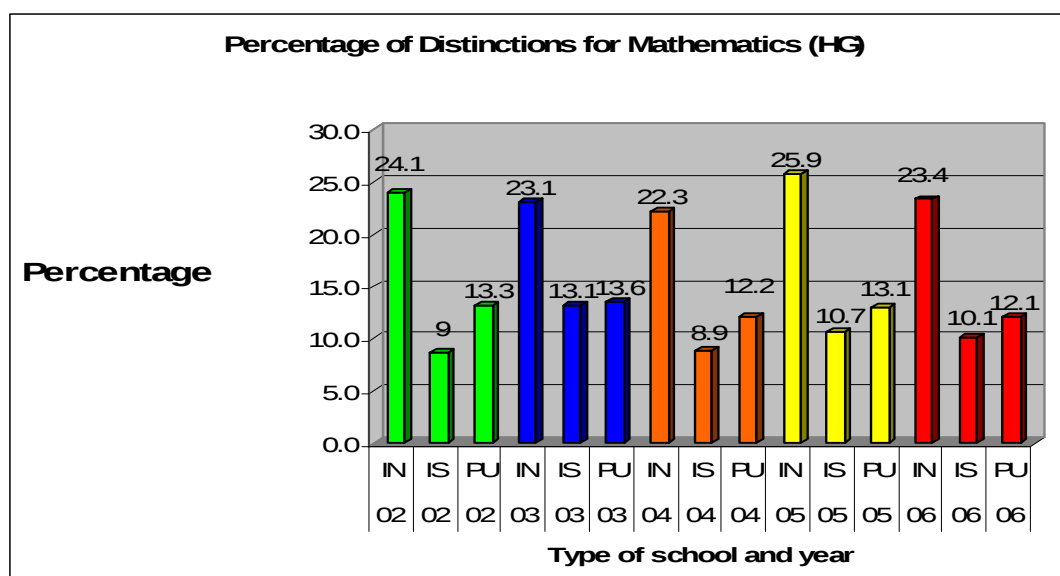
Calculations by Pillay using Examinations database from EMIS for 2002 to 2006

IN – Independent Schools, IS – Independent Subsidised Schools, PU – Public Schools

HG – Higher Grade, SG – Standard Grade

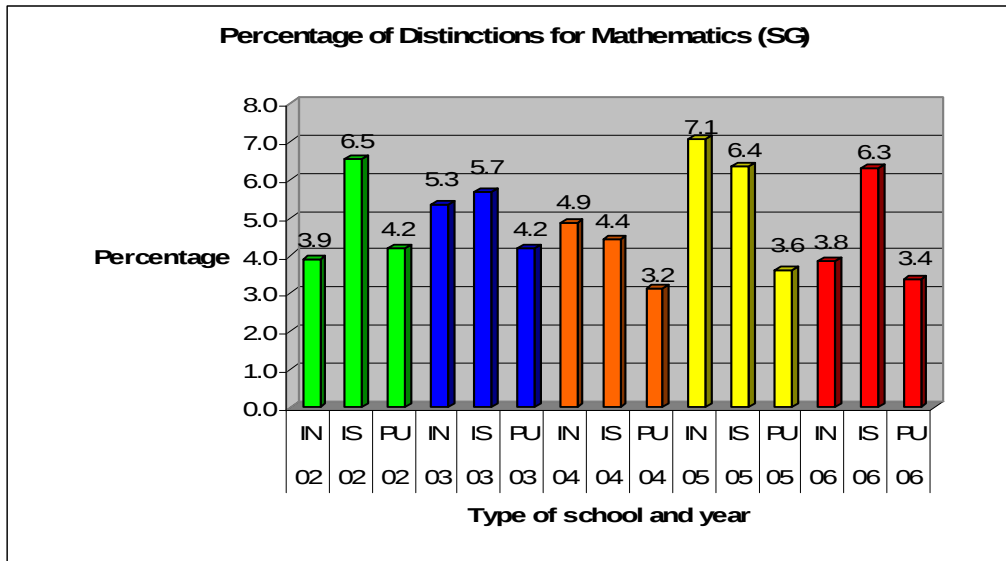
Figures 3 and 4, 5 and 6 illustrate the percentage of learners who obtained A symbols in Mathematics and Physical Science for 2002 to 2006. The number of learners who wrote Mathematics or Physical Science on higher grade or standard grade was added for each sector as well as the number of A symbols produced on both grades. The number of learners who obtained A symbols was then divided by the total number of learners who wrote Mathematics or Physical Science (HG or SG) and was then multiplied by one hundred. From the figures it can be seen that the highest percentage of A symbols in Mathematics and Physical Science (HG and SG) are obtained by the independent schools followed by public and then independent subsidised schools. However, the low percentage of A symbols in these key subjects in all three sectors must be noted.

Figure 3: Percentage of Distinctions for Mathematics (HG)



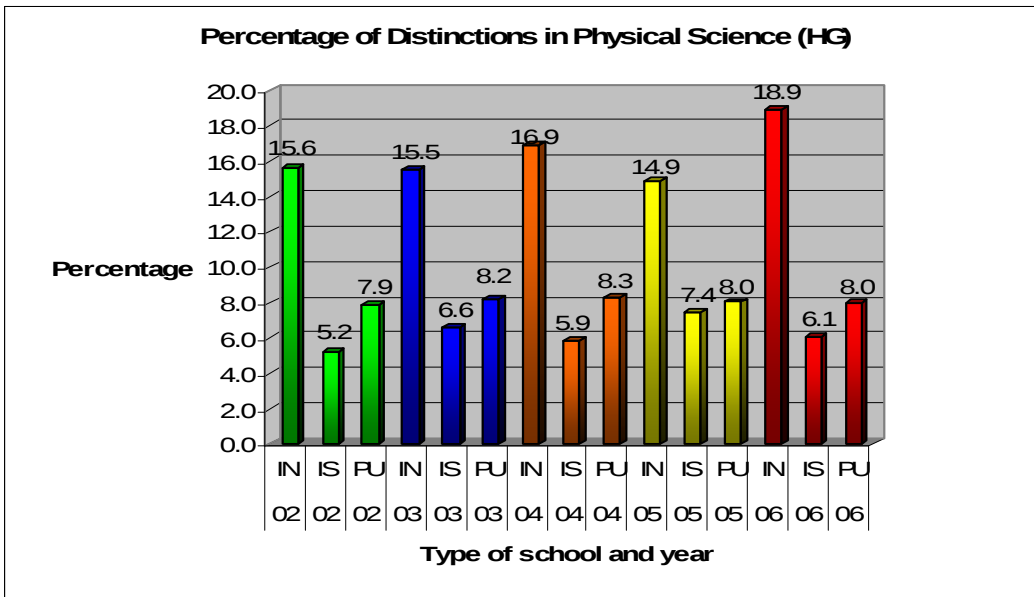
Calculations by Pillay using Examinations database from EMIS for 2002 to 2006
 IN – Independent Schools, IS – Independent Subsidised Schools, PU – Public Schools

Figure 4: Percentage of Distinctions for Mathematics (SG)



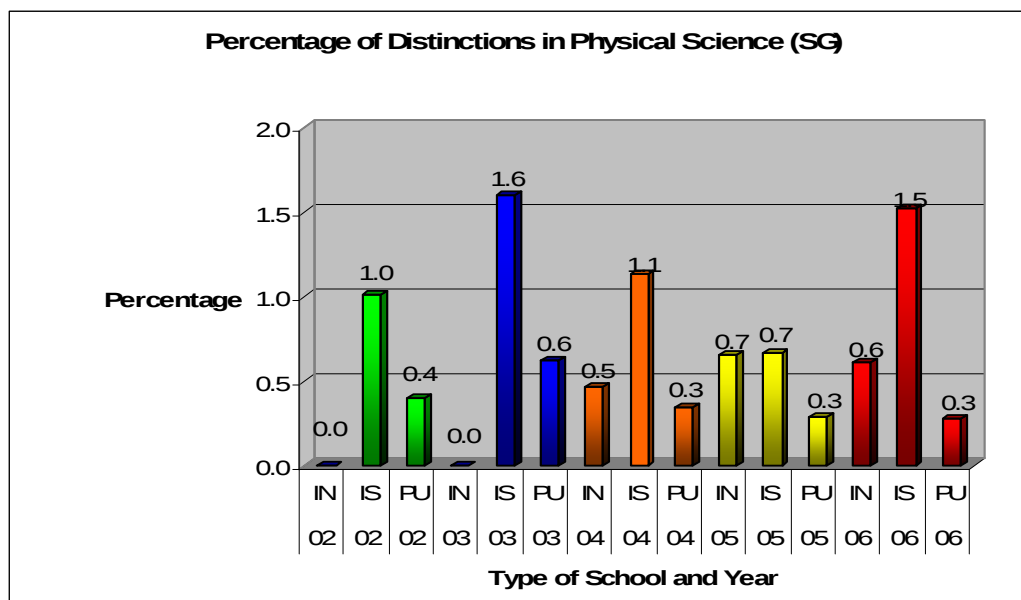
Calculations by Pillay using Examinations database from EMIS for 2002 to 2006
 IN – Independent Schools, IS – Independent Subsidised Schools, PU – Public Schools

Figure 5: Percentage of Distinctions in Physical Science (HG)



Calculations by Pillay using Examinations database from EMIS for 2002 to 2006
 IN – Independent Schools, IS – Independent Subsidised Schools, PU – Public Schools

Figure 6: Percentage of Distinctions in Physical Science (SG)



Calculations by Pillay using Examinations database from EMIS for 2002 to 2006
 IN – Independent Schools, IS – Independent Subsidised Schools, PU – Public Schools

4.2.3 Distribution of pass rates

The histograms presented in figures 7 to 11 show the distributions of pass rates achieved by schools for the period 2002 to 2006. The pass rates vary between 0 and 100 per cent. The histograms all show that pass rates are negatively distributed, with a significant higher proportion of schools having achieved pass rates of 96 per cent and higher. In fact, between 24 and 29 per cent of schools within a year recorded a pass rate higher of 96 per cent and higher.

Figure 7: Histogram of pass rates (2002)

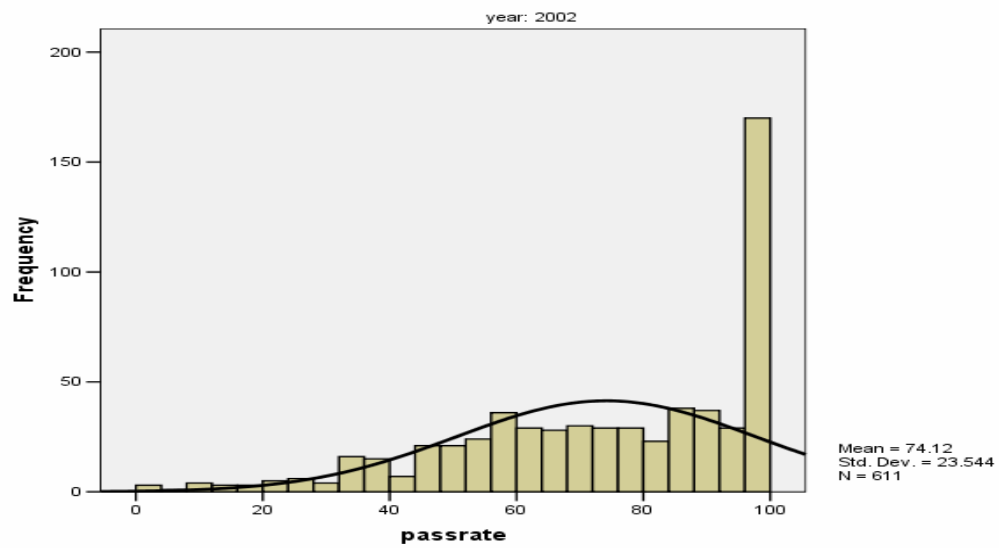


Figure 8: Histogram of pass rates (2003)

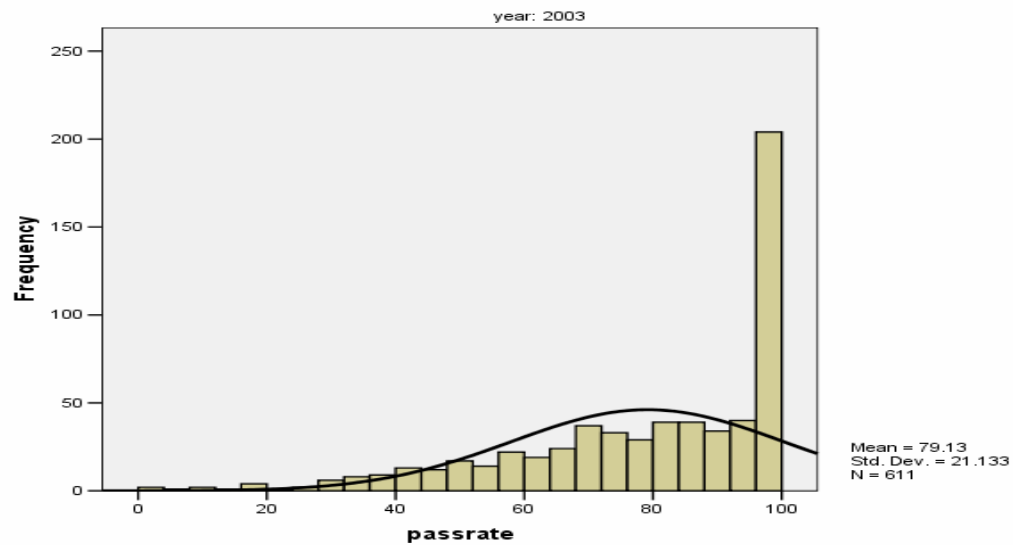


Figure 9: Histogram of pass rates (2004)

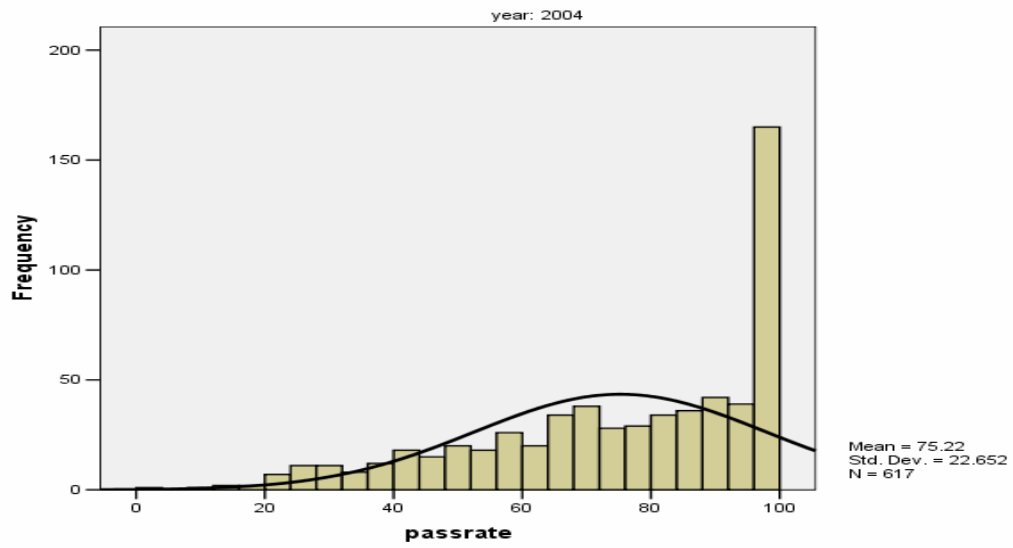


Figure 10: Histogram of pass rates (2005)

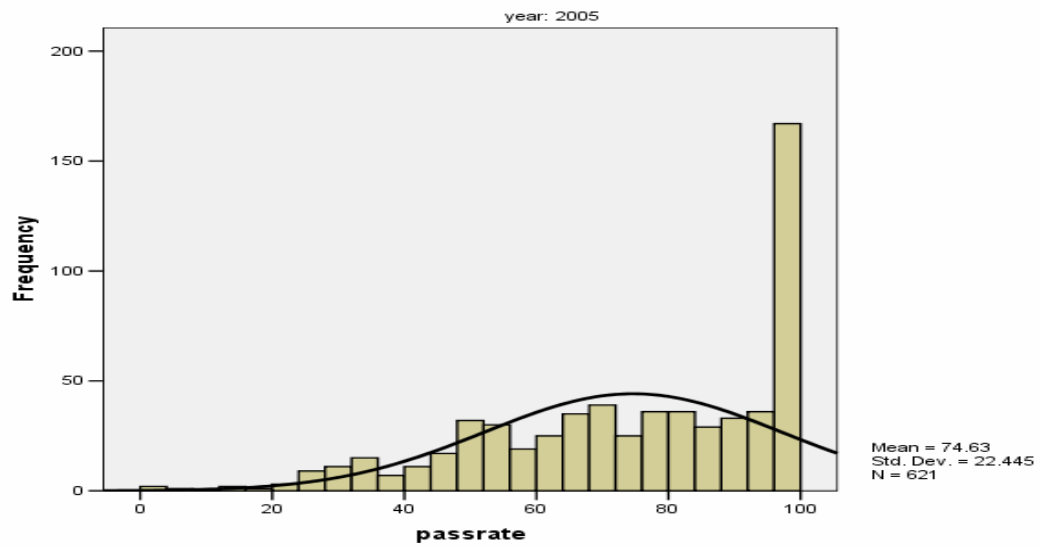
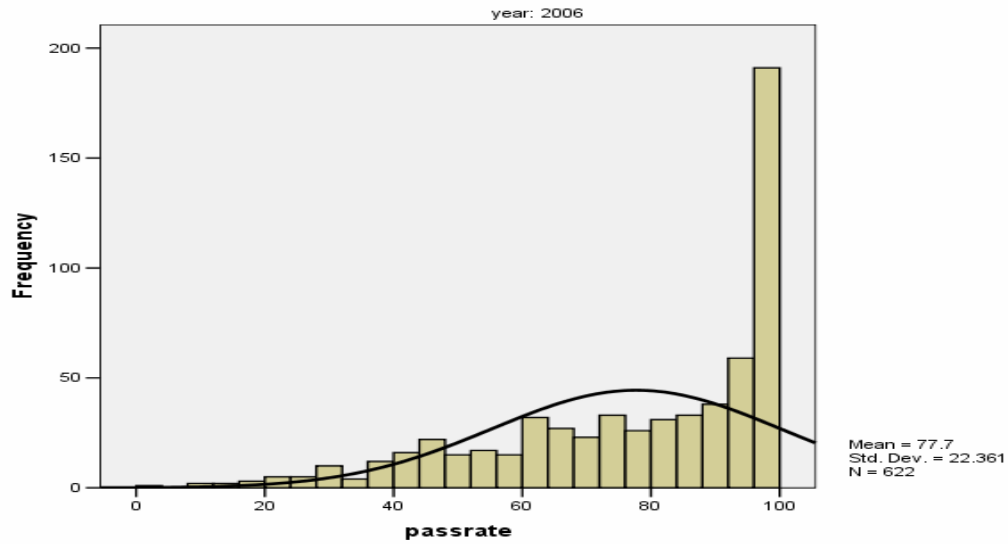
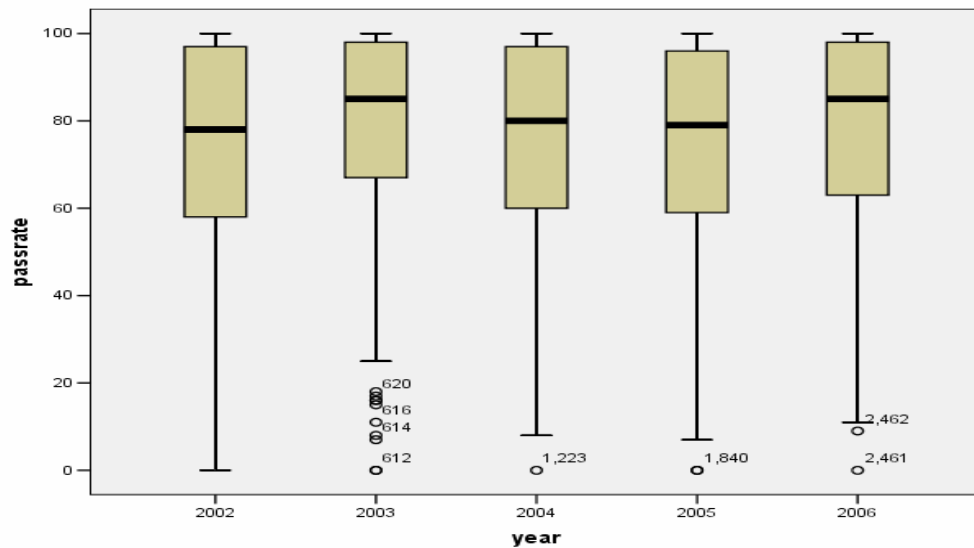


Figure 11: Histogram of pass rates (2006)



Examination of the box plot presented in figure 12 confirms that the data for pass rates are negatively distributed.

Figure 12: Box plot of pass rates (2002 - 2006)



Delucchi and Bostrom (2004: 1161) rightfully noted that a primary concern in approaching skewed data is that the mean of a skewed distribution may not

be the most appropriate summary statistic. This is also the case in the data presented in this study. Table 5 shows that the mean, median, mode and standard deviation for the various school types for each year. It is evident that the median values are higher than the average values, which is confirmation of negatively distributed distributions. The mode, which represents the value that occur the most, is in nearly all of the cases the highest possible pass rate that can be achieved, namely 100 per cent.

Table 5: Summary statistics of pass rates per year by type of school

		Mean	Median	Mode	Std Deviation	Valid N
2002	Independent	59.9	60.0	100.0	34.9	N=39
	Independent subsidised	70.2	77.0	100.0	28.4	N=95
	Public	76.1	79.0	100.0	20.7	N=477
2003	Independent	68.4	77.5	100.0	30.8	N=36
	Independent subsidised	75.5	84.0	100.0	26.1	N=98
	Public	80.7	85.0	100.0	18.7	N=477
2004	Independent	70.5	81.5	100.0	29.0	N=40
	Independent subsidised	74.3	83.0	100.0	26.5	N=98
	Public	75.8	80.0	99.0	21.2	N=479
2005	Independent	67.4	71.0	100.0	31.2	N=43
	Independent subsidised	78.6	83.0	100.0	21.8	N=95
	Public	74.5	78.0	100.0	21.5	N=483
2006	Independent	70.0	80.0	100.0	31.1	N=43
	Independent subsidised	80.0	89.0	100.0	22.0	N=95
	Public	77.9	85.0	100.0	21.4	N=484

Furthermore, in order to employ statistical tests such as the t-test or analysis of variance test (ANOVA), the underlying should be normally distributed. Delucchi and Bostrom (2004: 1161) note that the advantages of employing parametric tests are familiarity and ease of use. Also, this method tests the hypothesis that is usually of greatest interest, i.e., the equality of means. However, several possible disadvantages loom, which will question the use of parametric tests for this study. Firstly, as noted, the mean may not be the best descriptor of the skewed data under consideration. Secondly, it is difficult to judge how much non-normality or variance inequality is tolerable for employing parametric tests. Thirdly, although the data is skewed, the researcher can not make the assumption that the underlying data (distribution of all possible means) has a normal distribution. The distribution of all possible

means will still yield a skewed distribution, attributed by the fact that the average pass rates obtained from repetitive samples will tend to be clustered in the upper quartiles with a maximum pass rate of 100 per cent possible.

In essence then, employing parametric tests might yield results that are unreliable. The results obtained from an ANOVA analysis is shown in table 6. The researcher wanted to know if the average pass rates differed between the three types of schools, namely public, independent and independent subsidised. P-values less than 0.05 indicate that the mean values differ significantly (on a 95 per cent level of confidence). The table therefore shows that in 2002, 2003, 2005 and 2006, statistical significant differences can be observed. Further analysis in the form of post-hoc tests are needed to identify exactly which types of schools differ significantly in their mean pass rates. The results for the post-hoc tests (multiple comparisons) are presented in table 7. The p-values are presented in the third column under the notation 'Sig.' Tamhane's test statistics were used which assumes non-equal variances between groups (refer to Annexure 1 for statistical output on the Levene's homogeneity test of variances).

Although statistical significant differences in the means between the different types of schools were indicated in the ANOVA table for 2002, 2003, 2005 and 2006, the post hoc tests fail to show any significant differences for 2003, 2005 and 2006. The results are therefore contradictory and unreliable and can be attributed to the use of parametric tests while the data could not be considered normally distributed.

Table 6: Testing for differences in the mean pass rates between different types of schools (2002 – 2006) - ANOVA

ANOVA

passrate

year		Sum of Squares	df	Mean Square	F	Sig.
2002	Between Groups	11131.896	2	5565.948	10.348	.000
	Within Groups	327016.382	608	537.856		
	Total	338148.278	610			
2003	Between Groups	6591.480	2	3295.740	7.538	.001
	Within Groups	265831.305	608	437.223		
	Total	272422.786	610			
2004	Between Groups	1155.192	2	577.596	1.126	.325
	Within Groups	314920.270	614	512.899		
	Total	316075.462	616			
2005	Between Groups	3757.011	2	1878.506	3.762	.024
	Within Groups	308593.804	618	499.343		
	Total	312350.815	620			
2006	Between Groups	3079.400	2	1539.700	3.100	.046
	Within Groups	307424.980	619	496.648		
	Total	310504.379	621			

Table 7: Post Hoc tests (Multiple Comparisons)**Multiple Comparisons**

Dependent Variable: passrate

Tamhane

year	(I) type	(J) type	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
2002	IN	IS	-10.209	6.302	.296	-25.69	5.27
		PU	-16.118*	5.668	.021	-30.24	-2.00
	IS	IN	10.209	6.302	.296	-5.27	25.69
		PU	-5.909	3.066	.160	-13.34	1.52
	PU	IN	16.118*	5.668	.021	2.00	30.24
		IS	5.909	3.066	.160	-1.52	13.34
2003	IN	IS	-7.015	5.770	.542	-21.23	7.20
		PU	-12.245	5.202	.070	-25.25	.76
	IS	IN	7.015	5.770	.542	-7.20	21.23
		PU	-5.231	2.775	.175	-11.95	1.49
	PU	IN	12.245	5.202	.070	-.76	25.25
		IS	5.231	2.775	.175	-1.49	11.95
2004	IN	IS	-3.856	5.313	.852	-16.87	9.16
		PU	-5.354	4.691	.595	-17.01	6.31
	IS	IN	3.856	5.313	.852	-9.16	16.87
		PU	-1.498	2.844	.936	-8.38	5.39
	PU	IN	5.354	4.691	.595	-6.31	17.01
		IS	1.498	2.844	.936	-5.39	8.38
2005	IN	IS	-11.205	5.262	.108	-24.12	1.71
		PU	-7.097	4.861	.388	-19.15	4.95
	IS	IN	11.205	5.262	.108	-1.71	24.12
		PU	4.107	2.444	.259	-1.80	10.02
	PU	IN	7.097	4.861	.388	-4.95	19.15
		IS	-4.107	2.444	.259	-10.02	1.80
2006	IN	IS	-10.019	5.248	.172	-22.90	2.86
		PU	-7.900	4.836	.293	-19.89	4.09
	IS	IN	10.019	5.248	.172	-2.86	22.90
		PU	2.119	2.459	.774	-3.83	8.07
	PU	IN	7.900	4.836	.293	-4.09	19.89
		IS	-2.119	2.459	.774	-8.07	3.83

*. The mean difference is significant at the .05 level.

Other options for the analysis of this data were therefore sought by the researcher. One option that was considered was the transformation of the data to make it more normal and therefore suitable for employing parametric tests. Delucchi and Bostrom (2004: 1161) noted that by themselves, skewed

data might not be that difficult to deal with. Often, such observed distributions can be rendered more tractable by a simple nonlinear transformation, such as determining the logarithm of each value. For data with many similar values, transformations will however not help, as no transformation will change the fact that so many scores have the same value. Delucchi and Bostrom (2004: 1161) suggest that perhaps a more important consideration for the researcher should be what all these similar values represent.

Delucchi and Bostrom (2004: 1161) suggest the use of a two-part model for the analysis. This two-part model asks two questions that help guide the analysis. Firstly, is there a difference in the proportion of those schools with high pass rates? In other words, schools that can be considered as having a pass rate that is in line with the Gauteng Department of Education's suggested norm (after discussions with GDE EMIS data analysts). For this analysis, schools with a pass rate of 96 per cent and higher were considered as having obtained the minimum norm set by the GDE. This proportion of schools was represented by the spike on the right in the histograms. One simple way to answer this question is to conduct a Pearson's Chi-square test of Independence, to compare the proportional distributions of the three groups. If the distributions do differ, further multiple comparison analysis can be done to explore differences between schools. See section 4.2.4 for results.

The second question focuses on answering if there is a difference in the pass rates of those schools with pass rates lower than 96 per cent. These schools fall below the norm that was adopted for this study. To answer this question a nonparametric test such as the Kruskal-Wallis could be employed. See section 4.2.5 for results.

4.2.4 Testing for differences in proportions of schools with higher pass rates

Table 8 shows the results from the Pearson's Chi-square test of Independent schools to compare the proportional distributions of the three groups. In one of the cases the proportional distributions differ significantly. In other words,

irrespective of the type of school, the same proportion of schools obtained pass rates of 96 per cent and higher.

Table 8: Testing for differences in the proportional distributions of pass rates between different types of schools (2002 – 2006) – Pearson's Chi-square test of independence (Cross Tabulation of pass rates by school type)

Pass rate: * School type: Crosstabulation

year				School type:			Total
				Independent	Independent subsidised	Public	
2002	Pass rate:	95% and less	Count	29	70	342	441
			% within School type:	74.4%	73.7%	71.7%	72.2%
		96% and higher	Count	10	25	135	170
			% within School type:	25.6%	26.3%	28.3%	27.8%
	Total		Count	39	95	477	611
			% within School type:	100.0%	100.0%	100.0%	100.0%
2003	Pass rate:	95% and less	Count	25	67	315	407
			% within School type:	69.4%	68.4%	66.0%	66.6%
		96% and higher	Count	11	31	162	204
			% within School type:	30.6%	31.6%	34.0%	33.4%
	Total		Count	36	98	477	611
			% within School type:	100.0%	100.0%	100.0%	100.0%
2004	Pass rate:	95% and less	Count	31	71	350	452
			% within School type:	77.5%	72.4%	73.1%	73.3%
		96% and higher	Count	9	27	129	165
			% within School type:	22.5%	27.6%	26.9%	26.7%
	Total		Count	40	98	479	617
			% within School type:	100.0%	100.0%	100.0%	100.0%
2005	Pass rate:	95% and less	Count	29	62	363	454
			% within School type:	67.4%	65.3%	75.2%	73.1%
		96% and higher	Count	14	33	120	167
			% within School type:	32.6%	34.7%	24.8%	26.9%
	Total		Count	43	95	483	621
			% within School type:	100.0%	100.0%	100.0%	100.0%
2006	Pass rate:	95% and less	Count	29	61	341	431
			% within School type:	67.4%	64.2%	70.5%	69.3%
		96% and higher	Count	14	34	143	191
			% within School type:	32.6%	35.8%	29.5%	30.7%
	Total		Count	43	95	484	622
			% within School type:	100.0%	100.0%	100.0%	100.0%

Table 9: Pearson Chi-Square Tests

Chi-Square Tests				
year		Value	df	Asymp. Sig. (2-sided)
2002	Pearson Chi-Square	.254 ^a	2	.881
	Likelihood Ratio	.257	2	.879
	Linear-by-Linear Association	.242	1	.623
	N of Valid Cases	611		
2003	Pearson Chi-Square	.336 ^b	2	.845
	Likelihood Ratio	.339	2	.844
	Linear-by-Linear Association	.326	1	.568
	N of Valid Cases	611		
2004	Pearson Chi-Square	.409 ^c	2	.815
	Likelihood Ratio	.422	2	.810
	Linear-by-Linear Association	.167	1	.683
	N of Valid Cases	617		
2005	Pearson Chi-Square	4.706 ^d	2	.095
	Likelihood Ratio	4.541	2	.103
	Linear-by-Linear Association	3.601	1	.058
	N of Valid Cases	621		
2006	Pearson Chi-Square	1.529 ^e	2	.465
	Likelihood Ratio	1.499	2	.473
	Linear-by-Linear Association	.902	1	.342
	N of Valid Cases	622		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 10.85.

b. 0 cells (.0%) have expected count less than 5. The minimum expected count is 12.02.

c. 0 cells (.0%) have expected count less than 5. The minimum expected count is 10.70.

d. 0 cells (.0%) have expected count less than 5. The minimum expected count is 11.56.

e. 0 cells (.0%) have expected count less than 5. The minimum expected count is 13.20.

4.2.5 Testing for differences in schools with lower pass rates

The histograms presented in figures 13 to 17 show the distributions of those schools with pass rate up to 95 per cent for the period 2002 to 2006. Although the histograms show that pass rates are negatively distributed, the distributions do not have particular high spikes, as was the case earlier reported when the total data range was examined. The distributions are therefore considered suitable for conducting a nonparametric test and

because it has less similar values, the power of the tests is not compromised Delucchi and Bostrom (2004: 1163).

Figure 13: Histogram of schools with a pass rate up to 95 per cent (2002)

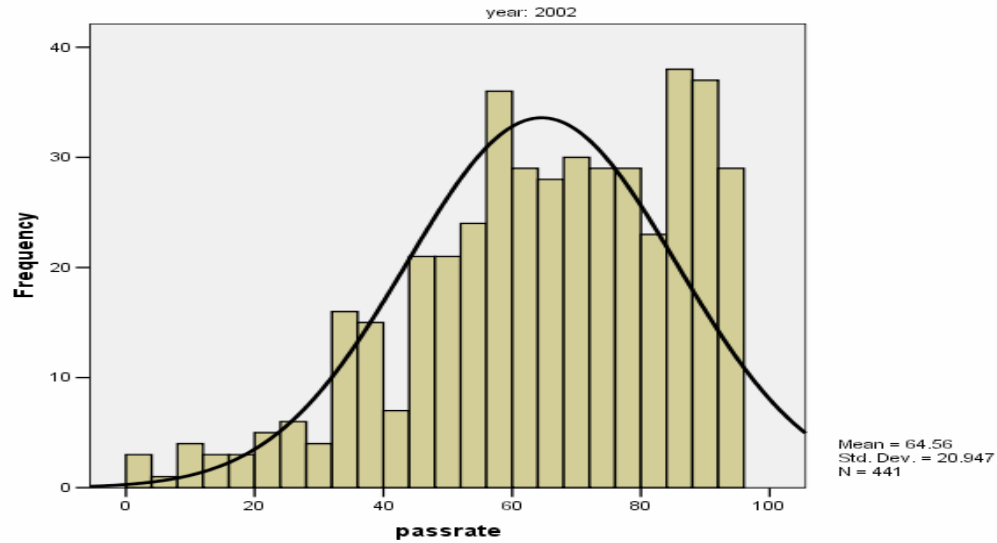


Figure 14: Histogram of schools with a pass rate up to 95 per cent (2003)

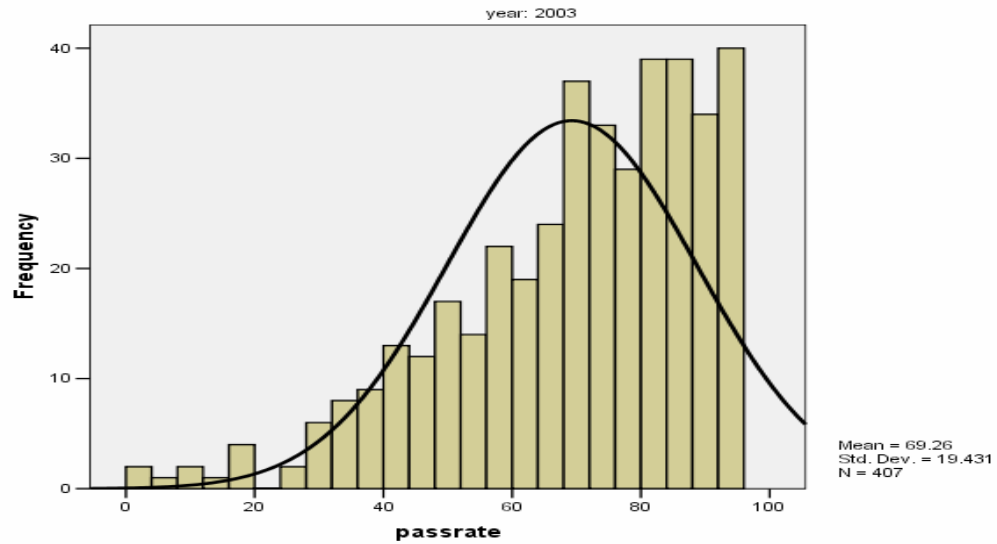


Figure 15: Histogram of schools with a pass rate up to 95 per cent (2004)

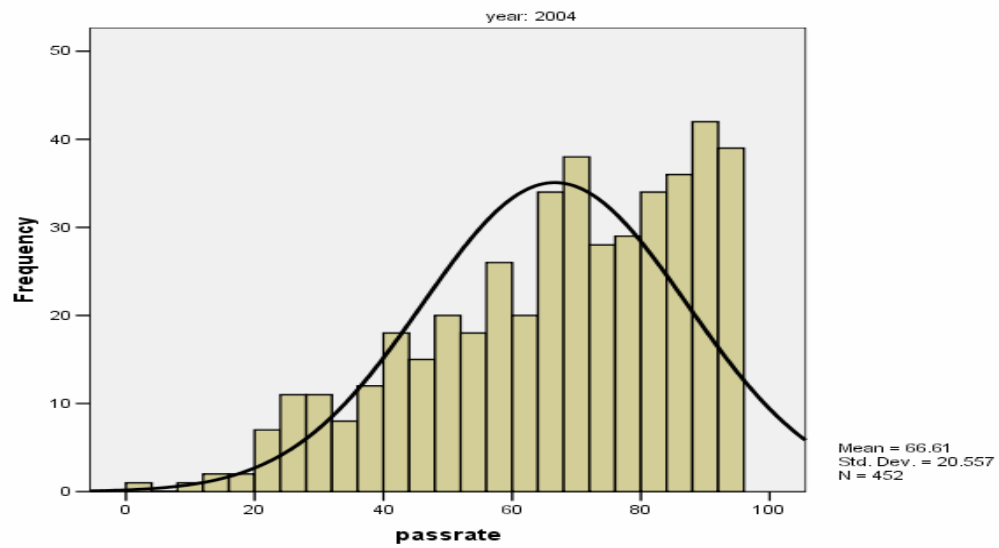


Figure 16: Histogram of schools with a pass rate up to 95 per cent (2005)

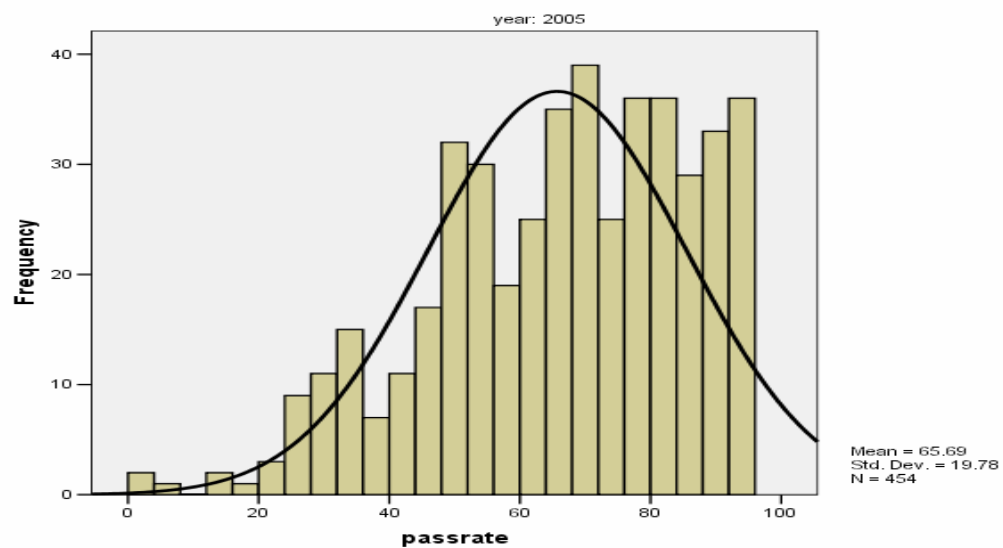
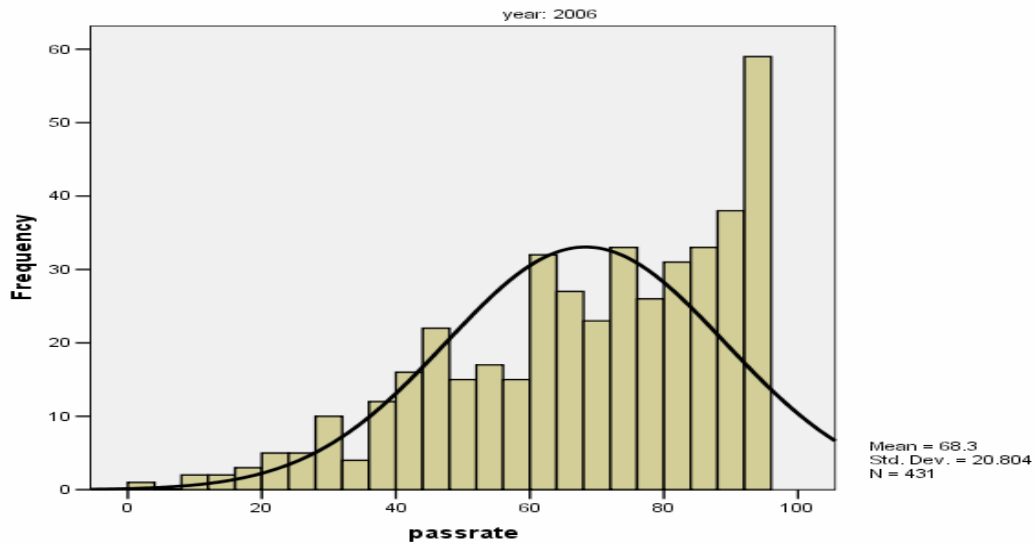


Figure 17: Histogram of schools with a pass rate up to 95 per cent (2006)



The results from the Kruskal-Wallis tests are presented in table 9. It should be noted that the hypothesis being tested is not that the medians (or means) are equal but that the three samples representing the difference types of schools come from the same distribution. That is, one is testing for equality of location and shape of the distributions, not for equality of any one aspect of the distribution. If the three distributions have similar shapes, then the test is one of equality of location, and the null hypothesis can be interpreted as a test of means.

The results indicate that in 2002, 2003 and 2005, the distributions between the various types of schools differed significantly. Further descriptive measures are therefore necessary to identify differences in the data.

Table 10: Testing for differences in the distributions of pass rates for different school types (2002 – 2006) – Kruskal Wallis test

Test Statistics^{a,b}

year		passrate
2002	Chi-Square	15.922
	df	2
	Asymp. Sig.	.000
2003	Chi-Square	10.199
	df	2
	Asymp. Sig.	.006
2004	Chi-Square	.234
	df	2
	Asymp. Sig.	.890
2005	Chi-Square	8.818
	df	2
	Asymp. Sig.	.012
2006	Chi-Square	5.838
	df	2
	Asymp. Sig.	.054

a. Kruskal Wallis Test

b. Grouping Variable: type

Table 10 presents various statistics which provide indication of the differences in pass rates between the different school types. Of particular interest are those years that showed significant differences in the distributions of pass rates by school type.

Examination of the statistics presented in the table reveals that for 2002, 2003 and 2005, independent schools recorded the lowest mean and median pass rates. Public schools on the other hand recorded the highest mean and median pass rates in 2002 and 2003 whilst independent subsidised schools recorded the highest mean and median pass rates in 2005. A further comparison reveals that the average public school in 2002 and 2003 had a 25 per cent higher pass rate than the average independent school. In 2005 and 2006 the difference were lower with the average public school performing respectively 8 per cent and 13 per cent better than independent schools.

Examination of the 50th percentile value also shows that in 2002, 2003 and 2005, half of independent schools studied recorded pass rates below 60 per cent. In fact, for 2002 and 2003 50 per cent of the independent schools studied recorded pass rates of less than 50 per cent. The other school types recorded pass rates above 60% for half of the schools studied.

Lastly, pass rates varied more amongst independent schools compared to the other school types when examining the standard deviation values.

Given these statistics and indicators of location, it would seem as if independent schools' performances were lower in 2002, 2003 and 2005 compared to the other schools.

Table 11: Summary statistics of pass rates by school type (2002 – 2006) – Filtered for schools with pass rates up to 95 per cent

year			School type:			Total
			Independent	Independent subsidised	Public	
2002	Pass rate:	Mean	46.3	59.5	67.1	64.6
		Median	43.0	64.5	68.0	67.0
		Percentile 25	18.5	35.8	55.0	52.0
		Percentile 50	43.0	64.5	68.0	67.0
		Percentile 75	77.0	84.0	82.0	83.0
		Std Deviation	29.9	25.7	17.8	20.9
		Valid N	N=29	N=70	N=342	N=441
2003	Pass rate:	Mean	54.7	64.3	71.5	69.3
		Median	49.0	71.0	74.0	73.0
		Percentile 25	36.0	46.0	61.0	57.0
		Percentile 50	49.0	71.0	74.0	73.0
		Percentile 75	80.5	85.0	85.0	85.0
		Std Deviation	27.2	24.6	16.7	19.4
		Valid N	N=25	N=67	N=315	N=407
2004	Pass rate:	Mean	62.0	64.7	67.4	66.6
		Median	67.0	71.0	70.0	70.0
		Percentile 25	33.0	46.0	54.8	52.0
		Percentile 50	67.0	71.0	70.0	70.0
		Percentile 75	88.0	85.0	83.0	84.0
		Std Deviation	27.8	25.2	18.7	20.6
		Valid N	N=31	N=71	N=350	N=452
2005	Pass rate:	Mean	51.9	67.5	66.5	65.7
		Median	60.0	72.5	68.0	68.0
		Percentile 25	30.5	53.8	52.0	52.0
		Percentile 50	60.0	72.5	68.0	68.0
		Percentile 75	71.5	83.0	83.0	82.0
		Std Deviation	26.4	19.2	18.9	19.8
		Valid N	N=29	N=62	N=363	N=454
2006	Pass rate:	Mean	55.8	69.4	69.2	68.3
		Median	59.0	74.0	72.0	72.0
		Percentile 25	30.5	51.5	56.5	53.0
		Percentile 50	59.0	74.0	72.0	72.0
		Percentile 75	80.5	87.5	86.5	86.0
		Std Deviation	28.3	20.8	19.8	20.8
		Valid N	N=29	N=61	N=341	N=431

4.2.6 Correlation analysis

Further analysis in the form of linear correlation analysis was performed on those schools with a pass rate up to 95 per cent. The table below shows the Pearson's Correlation Coefficients which provides an indication of the measure of linear strength between two scale variables. Of particular interest was to study how school type, fees charged and learner-to-educator ratio correlated with pass rates. Table 12 shows the results from the analysis. Significant correlations ($r > 0$) are highlighted in grey. In general, although correlated weakly, pass rates showed some signs of positive correlation with school fees in 2004, 2005 and 2006, LER in 2002 and 2003 and public schools in 2002 and 2003. On the other hand, pass rates were correlated negatively with independent schools (in 2002, 2003, 2005 and 2006) and independent subsidised schools (in 2002 and 2003).

Although significant, the weak linear correlations should be interpreted with caution. In other words, variation in one variable (for example school fees) can not be considered a good linear predictor of variation in another variable (for example pass rate). It could therefore be anticipated that if the variables were to be used in a linear regression analysis, the variables would not be good predictors and high residual values are to be expected.

Table 12: Pearson Correlation Coefficient

		2002	2003	Pass rate 2004	2005	2006
School fees	Pearson Correlation	0.09	0.04	0.24	0.23	0.20
	Sig. (2-tailed)	0.052	0.398	0.000	0.000	0.000
	N	441	407	452	454	431
LE ratio	Pearson Correlation	0.16	0.16	-0.10	-0.09	0.00
	Sig. (2-tailed)	0.001	0.002	0.035	0.062	0.993
	N	441	407	452	454	431
Public	Pearson Correlation	0.23	0.21	0.07	0.08	0.08
	Sig. (2-tailed)	0.000	0.000	0.131	0.084	0.089
	N	441	407	452	454	431
Independent	Pearson Correlation	-0.23	-0.19	-0.06	-0.18	-0.16
	Sig. (2-tailed)	0.000	0.000	0.199	0.000	0.001
	N	441	407	452	454	431
Independent (subsidised)	Pearson Correlation	-0.11	-0.11	-0.04	0.04	0.02
	Sig. (2-tailed)	0.027	0.023	0.399	0.452	0.668
	N	441	407	452	454	431

4.2.7 Multiple regression analysis

Table 13 shows the results obtained from a regression analysis. As described in section 3.3.7, the relationship in the multiple linear regression model is represented by the statistical equation:

$$y = c + b_1x_1 + b_2x_2 + \dots + b_kx_k + e$$

where y = dependent variable

x_i = independent variables

b_i = coefficients

e = error

In this study the researcher hypothesised that the matriculation pass rate is influenced (amongst other) by three factors, namely (1) the amount of school fees paid; (2) the Learner-to-Educator ratio and (3) the type of school (independent, public or independent subsidised). Learner performance (as measured by the pass rate) is the dependent variable (y variable) and the independent variables are the LER (x_1), school fees (x_2) and type of school (x_3 and x_4). Because the type of school is classified into three categories, two dummy variables (x_3 and x_4) were created to represent the various categories.

	X_3	X_4
PU	1	0
IN	0	1
IS	0	0

For the regression analysis, the following three basic assumptions were made:

- All independent schools writing the provincial or national examinations were included in the study over the period 2002 and 2006. This is the only common indicator of learner performance or output from both the public and independent sector during this time.

- There are other variables that influence learner performance such as resources, teacher qualifications etc which are not considered as the scope of this study.
- The school fees of each school are correct as reflected by schools on the survey.

Again only schools with a pass rate up to 95 per cent were included in the analysis.

Table 13: Regression analysis

year	R-square		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
2002	0.179	(Constant)	38.788	4.67		8.304	0.000
		Independent	-16.700	4.25	-0.20	-3.926	0.000
		School fees	0.004	0.00	0.44	7.568	0.000
		Public	15.747	3.26	0.31	4.830	0.000
		LE ratio	0.332	0.16	0.13	2.140	0.033
2003	0.129	(Constant)	51.564	3.11		16.570	0.000
		Independent	-12.615	4.30	-0.16	-2.937	0.004
		School fees	0.004	0.00	0.38	5.862	0.000
		Public	18.445	3.12	0.40	5.917	0.000
2004	0.129	(Constant)	53.035	2.72		19.519	0.000
		Independent	-9.934	4.24	-0.12	-2.341	0.020
		School fees	0.003	0.00	0.43	7.946	0.000
		Public	12.458	2.79	0.25	4.463	0.000
2005	0.166	(Constant)	52.453	2.91		18.051	0.000
		Independent	-18.775	4.09	-0.23	-4.585	0.000
		School fees	0.004	0.00	0.45	8.456	0.000
		Public	11.283	2.88	0.23	3.917	0.000
2006	0.113	(Constant)	59.159	2.97		19.890	0.000
		Independent	-14.780	4.44	-0.18	-3.329	0.001
		School fees	0.002	0.00	0.34	6.444	0.000
		Public	8.473	3.05	0.17	2.782	0.006

As expected and based on the results from the correlation analysis, the R-square values are very low. The R square is an indication of the proportion of variation in the dependent variable (pass rate) that is explained by the regression model (or predictors). In other words, the regression models only explain a very small percentage of the variation in pass rates.

Despite the low R-square values, the signs associated with each of the coefficients reveal some insight into the prediction of pass rates. This can be summarised as follows.

- Prediction of pass rates for schools that are classified as independent would be lower than other school types (if all other variables are kept constant).
- Prediction of pass rates for schools that are classified as public would be higher than other school types (if all other variables are kept constant).
- If school fees increases, pass rates are also expected to increase (if all other variables are kept constant). However, this not a causal analysis.

The model for 2002 included LER as a predictor variable. If the LER increases, pass rates are expected to increase (if all other variables are kept constant).

4.3 FINDINGS

The results showed that there were no difference in the proportion of public and independent schools with recorded pass rates of 96 per cent and higher. However, further analysis on schools with pass rates of 95 per cent and lower, did show that the average public school in 2002 and 2003 had a 25 per cent higher pass rate than the average independent school. In 2005 and 2006 the differences were lower with the average public school performing respectively 8 per cent and 13 per cent better than independent schools. The results from a regression analysis also revealed that public schools tend to yield higher pass rates than other school types. With regard to school fees, the regression model also showed that higher school fees (have a slight positive effect on) are associated with higher pass rates.

Considering, however, the percentage of variation in pass rates explained by the regression models, the type of school only has a limited effect on the overall pass rate in the Senior Certificate Examination. Schools that charge

higher fees do produce better results irrespective of the type of school. The researcher found that the results were inconclusive towards the real effect of LER.

It was also important to establish the percentage of learners who wrote for endorsements rather than senior certificates. Schools were evaluated by the overall pass rates and not the percentage of learners passing with endorsements. In the future world of study and employment the emphasis is on the type of matriculation pass (endorsement or senior certificate) obtained. Table 3 indicates the number of learners in the three sectors that wrote for endorsements and senior certificates between 2002 and 2006. In all three sectors at least 50 per cent of learners wrote for the senior certificate. The public sector has the highest percentage of endorsements overall in all five years.

Although pass rates for individual subjects did not form part of this study the analysis of the Mathematics and Physical Science results is a good indicator of the quality of education. The number of learners taking Mathematics did not increase significantly over the five years. Despite major efforts by the Department of Education in the National Strategy for Mathematics, Science, and Technology Education (2001) in terms of promoting these subjects the pass rates for Mathematics and Physical Science remained low. The majority of the learners were also taking these subjects on the standard grade.

The perception (refer to Chapter 1, paragraph 1.1) that the quality of education in independent schools is superior may explain why parents choose to send learners to independent schools at a relatively higher cost. However, on the basis of the data and analyses that were presented in this chapter, it could be argued that this perception is unfounded. This finding would suggest that the choice of schooling must be benchmarked carefully so that informed decisions can be made on the choice of schooling.

4.4 SUMMARY

In this chapter an analysis and interpretation of the empirical data was undertaken. Queries were conducted using the computer programme MS-Access to calculate the percentage of endorsements in public, independent and independent subsidised schools. MS-Access was also used to determine the pass rates for Mathematics and Physical Science as well as the percentage of A symbols in these subjects.

The data used in the analyses for the years 2002 to 2006 was not normally distributed; as a result a number of statistical tests and analysis were conducted. Other options for the analysis of this data were therefore sought by the researcher. One option that was considered was the transformation of the data to make it more normal and therefore suitable for employing parametric tests. The researcher employed the method suggested by Delucchi and Bostrom (2004) in which a two-part model was used to ascertain firstly if there was a difference in the proportion of schools with high pass rates (96 percent to 100 per cent) and secondly if there was a difference in the pass rates of schools with pass rates lower than 96 per cent. These were done using a Pearson's Chi-square test of Independence and the Kruskal-Wallis test respectively. Correlation analyses as well as multiple regression analysis were also done to investigate the relationship between pass rates, school type, LER and school fees.

Chapter 5 offers a review of the entire study, presents a further focus on the findings, and suggests possible recommendations and topics that could be further researched.

CHAPTER 5

CONCLUSION, FINDINGS AND RECOMMENDATIONS

5.1. INTRODUCTION

The role of educational planners has evolved from increasing school enrolments to improving the quality of schooling in a way that the focus has now shifted to school effectiveness (Scheerens, 2000:9). In this study the researcher set out to investigate whether independent or public schools provide more effective education. The Senior Certificate Examination is an important determinant of the education system as it contributes to the educated citizens and labour force of South Africa. It is the Senior Certificate Examination that determines the entrance of learners into universities, as well as into the employment industry.

This final part of the thesis now offers a general review of the study, recaps on the important findings from the literature and the quantitative analysis, presents the recommendations and concludes the argument.

5.2. REVIEW OF THE STUDY

Chapter 1 was the orientation of the study and formed the foundation for the entire research. A description of the problem statement, purpose of the research, the research objectives, introduction to the research methodology used, clarification of concepts and limitations of the study were presented. This chapter thus indicated why this study is important and also locates the relevance to the education system in South Africa. The chapter also provides a backdrop to the debate on the effectiveness of the independent and public sector and the importance of using a common indicator when comparing the performance of the two sectors. The common perception in most countries including is that independent schools are more effective than public ones (refer to section 1.1).

Chapter 2 presented a literature review of the research study and explored key issues pertaining to the problem statement. Literature clarifying the definition of effectiveness as used in this study was investigated, the debate of public versus independent schooling, the use of Mathematics and Physical Science results in benchmarking effectiveness, school fees and learner-to-educator ratio was reviewed. A review of relevant policy documents in order to place the study in the context of the relevant policy was also undertaken in this chapter. It is apparent from the literature review that in most studies conducted nationally and internationally the conclusion is that the independent schooling sector outperforms its public counterparts. The effectiveness of schools is mostly determined by the performance of learners in standardised tests.

Chapter 3 described the research design and methodology that was followed for this study. In terms of the research design the importance of quantitative data research was explained as this study only used this method of investigation. The use of trend data was also highlighted under this section as the researcher used multi-year data for 2002 to 2006. For the research methodology the sampling, instruments used, data collection processes, coding of data, scanning and cleaning of data, organising of data, definition of variables, data analysis and techniques employed, definition of statistical and technical concepts as well as the reliability and validity of the research instruments are explained. The chapter puts the analysis done in Chapter 4 into perspective.

Chapter 4 presented an analysis of the Senior Certificate Examination data for 2002 to 2006 to establish which sector performed better. The findings of the analysis were illustrated using graphs and tables. The percentage of learners obtaining endorsements and senior certificates in the independent, independent subsidised and public schools were calculated. It was found that the majority of learners in all three types of schools over the period of investigation wrote for a senior certificate. This does not reflect well on the quality of passes received by the majority of learners in Gauteng. The percentage of A symbols received in mathematics and Physical Science was

also calculated. These percentages are low in all three sectors. Statistical analyses were conducted to establish what percentage of the variation in the matriculation results can be explained by school fees, type of school and learner-to-educator ratio. Separate analyses were done for the various years under investigation in order to predict the pass rate by looking at the independent or predictor variables (learner-to-educator ratio, type of school and school fees). Further discussion on the quantitative findings is done in section 5.3.

Chapter 5, the current chapter, thus follows through and synthesises the main findings and presents a set of recommendations. This constituted the last chapter of the report and focused on the review of the study, important findings from the literature study, quantitative findings, recommendations and conclusion as outlined below.

From this study the importance of effective education is clear in both public and independent schools.

The findings from the literature review will be explored in the next section.

5.3. IMPORTANT FINDINGS FROM THE LITERATURE

The following findings were reached from the literature review:

Finding 1

There are various definitions for the term school effectiveness. Scheerens (2000) argues that the criteria used to judge whether schools are effective or not are “relative” and not “absolute”. For the purpose of this study, which is a comparative study, effectiveness is measured using the outcome of performance in the Senior Certificate Examination (see Section 2.2.1). There are various researchers who use learner performance to distinguish between effective and non-effective schools. Scheerens (2000: 18) confirms that school effectiveness is the performance of the school.

Finding 2

Internationally and locally a majority of researchers have concluded that the independent schools perform better on standardised tests than public schools. The reason cited for the better performance include issues of better qualified educators, smaller classes, screening of learners and accountability to parents because of the amount of school fees charged (see Section 2.2.2).

As Henning (1993:12) points out that according to a study conducted by the Human Sciences Research Council (HSRC) in 1978 some of the advantages of independent schools included that pupils performed better in objective tests, pupils have more positive attitudes, pupils received more attention in the classroom, classes were smaller, more of the learners gained university entrance etc. The general conclusion from most researchers, including Henning, is that the education in independent schools is of better quality. Therefore this study needed to be placed at the centre of the debate between public and independent schools because of the scope of findings from other studies it may seem insufficient to compare public and independent schools using only the Senior Certificate Examination. However, many researchers in South Africa (such as Dieltiens and Motala) use the Senior Certificate Examination to assess the performance of the education system.

Finding 3

The amount of school fees charged may affect the quality of education because it allows schools to purchase resources such as educators which help to improve learner performance (see Section 2.2.3). Independent schools charge more school fees than most public schools. However, there are also some ex-TED (ex model C) public schools which are also charging comparatively high school fees; the issue is whether this input translates into more effective education. Parents are paying significantly higher fees in independent schools with the objective of receiving better quality education for their children. Independent schools are also subsidised partly by the Department and have to maintain certain levels of performance in the Senior

Certificate Examinations. It was, therefore, important to investigate the relationship between learner performance and school fees.

Finding 4

It is common knowledge that independent schools have smaller class sizes than public schools. As Henning (1993) as well as Muller (1990) confirm, this results in arguing that there is more individual attention between educator and learner which results in better performance of learners. There are also public schools that maintain small LERs. It is important for such correlations to be highlighted so that education planners may make informed decisions when considering factors that affect learner performance.

Important findings from the quantitative data analysis

Finding 5

The question asked in this research is whether public or independent schools offer more effective education as determined by the indicator of matriculation performance. In terms of overall pass rates the independent schools produced the lowest percentage pass rate over the five years. On an average, both the independent and independent subsidised sector which represents independent schooling produced lower pass rates than the public schooling sector for four out of the five years. It was important to separate independent and independent subsidised schools as this is firstly the breakdown used on a national and provincial level in education. This disaggregation also does not mask the performance of the poorer performing sector which in terms of this study is the independent sector. When comparing the three types of schools it was found that the public schools performed better than the independent and independent subsidised schools. There was a significant difference between public and independent schools. The independent subsidised schools performed slightly lower than the public schools. The trend was consistent over the five years. This is not to say that all the independent schools performed poorly as in all three sectors there are schools that produced consistently good results. The average pass rates are, therefore, dragged

down by the poor performing schools. It must also be remembered that the independent schooling sector is unstable and there are schools which may establish themselves for one or two years and produce poor results and then close down.

Finding 6

The majority of learners in all three types of schools were writing for senior certificates. The issue of the quality of the pass rate needs to be emphasised as it seems that schools have lost the focus which is on the number of learners who pass, not necessarily on what the quality of the pass obtained. Schools are judged (as good or ineffective) based on their pass rates and not the number of learners passing with endorsement or senior certificates.

Finding 7

Mathematics and Physical Science are important indicators of performance of the school system. The pass rates in these subjects are not significant in any of the sectors if one considers that the majority of the Gauteng learners who wrote these subjects do so on the standard grade. The percentage of distinctions in these subjects is also very low. This is of concern as the education system needs to prepare learners for contributing to the socio-economic and technological development of South Africa, for the global market. Studies by Hanushek *et al.* (2008) demonstrate South Africa's poor performance in these subjects in the international context as well.

Finding 8

It is not always ideal to base school effectiveness on quantitative data alone. There are always qualitative questions which arise from the analysis of the statistics. Having highlighted the facts in terms of the quantitative analysis a more qualitative theme can be raised. As can be seen from the regression and correlation analysis the matriculation pass rates are dependent on other variables. These may include factors such as school size and educator qualifications. However, the regression analysis of school fees and LER is

important in the debate of public and independent schools as these are the major reasons for parents choosing public or independent education. The effects of these factors are important (not in isolation) to assist parents in the choice of school and for decision makers to understand the effects of some of the factors affecting learner performance. Both of these factors according to this study however did not have a significant impact on the matriculation passed rates at schools.

Having discussed the findings from the literature as well those from the quantitative data analysis, it is important to discuss some recommendations which resulted from this research project.

5.4. RECOMMENDATIONS

(a) Substantive Recommendations

My recommendations following this research are as follows:

The finding that public schools are more effective than independent schools is contradictory to the findings of King (1996:31) and others quoted in the literature survey in Chapter 2 in which it was concluded that independent schools in India and other countries produce better quality education. However, King also suggests that more research is required as well as data that can be internationally comparable in order to be confident about the conclusion. Based on this argument, it is important to establish if the trend in Gauteng is consistent in other provinces in South Africa. National and provincial departments of education should investigate the reasons for the poor performance of learners across all sectors of the education system. Research needs to be done in terms of factors that affect the performance of learners and strategies to address these must be put into place. This research was confined to investigating schools which write the National Senior Certificate Examination in Gauteng. It would be interesting to determine if this trend exists in other provinces. A comparative study using a common

instrument (test) in public and independent schools at different grades may also be worth investigating.

- In the argument of the more effective type of school using the Senior Certificate Examination as an indicator of performance one must consider the number of learners writing for endorsement and senior certificates. The trend is to have high pass rates and to reduce the importance of obtaining a better quality certificate. Schools need to prepare learners for entrance into tertiary education and with the lower number of learners writing and passing matriculation endorsement the emphasis on pass rates needs to be shifted. Schools need to be encouraged to produce more matriculation endorsements as an indicator of performance.
- The majority of the learners in matric are taking Mathematics and Physical Science on the standard grade in both public and independent schools. It is important to ascertain why this is the case as this may hamper the entrance of learners for certain courses at university as well as the potential and ability of learners in the labour market. Increased participation must be encouraged by schools in the subject's Mathematics and Physical Science on the higher grade. However, the reason for poor performance of learners in these subjects needs an in-depth study. Schools that are producing excellent pass rates in these subjects need to be investigated with a view to serving as mentors to other poor performing schools. These schools are both in the public and independent schools and there are lessons to be learnt from these schools.
- Provincial and national assessment standards for public and independent schools must be developed at different grade levels. Participation in these assessments must be compulsory. This is to ensure that the standard of education is monitored and reviewed at different grades. These tests may provide relevant information on the skills and knowledge of learners at the appropriate age and ensure that

learners receive the same standard of education irrespective of the type of school they attend. The results from these tests need to be analysed and used by education planners to combat the factors impeding learner performance. As discussed previously in the literature review (see Chapter 2 on Henning, 1993 and Beavis, 2004) parents choose independent schools over public schools because it is believed these schools offer better quality education because they have more and better qualified educators, have smaller classes and better discipline. Schools that are performing poorly in both sectors need to be investigated. Reasons for poor performance in both sectors must clearly also be addressed. It would be interesting to follow up on the factors that contribute to the variations in learner achievement in South Africa as there are schools in both sectors that consistently produce excellent matriculation results and those that are performing poorly every year.

- Feedback or analysis of examination results must be published as it provides important knowledge to learners about their own performance in relation to the required standard as well as to educators about their teaching practices and what can be done to improve these. It will also provide parents with information about the content being taught and the standards and whether their children are performing adequately. The results of these tests can provide the Department of Education with the basis for policy redress, improvement and change.

5.5 TOPICS FOR FURTHER RESEARCH

Conducting continuous research is crucial to ensure that improvements and learning takes place in the education sector as a whole. As the research findings and associated recommendations suggested, there is a need to further investigate several aspects of the broad research theme of the current thesis. Along with the findings of this research project, such further investigations will facilitate valuable in-depth understandings of education undertaken by the different sectors. Some of these topics that require additional research are:

- The equality of educational choice in South Africa.
- Improving school effectiveness in South Africa.
- Establishing school effectiveness indicators for both public and independent schools.

5.6 CONCLUSION

The conclusion from this study is that the public schools in Gauteng, South Africa, performed better than the independent schools in the Senior Certificate Examination and, therefore constitutes the more effective schooling sector. Yet, the research also showed that the pass rates in all three sectors are low in terms of aggregate pass rates and endorsements. The emphasis in both public and independent schools seems to be on the number of learners who pass and not the quality of the pass rate as most of the matric learners are writing for Senior Certificates.

The findings cited in this research study do not suggest that one sector is necessarily superior to the other, as the findings need to be tested with other data sets in other environments. The subsidiary differences found in this study in learner achievement may still persist if learners move from independent to public schools. However, the study does offer initial statistical evidence on an issue that has been largely subjected to speculation and disturbing debates regarding public and independent schools in South Africa. One immediate

significance of the research findings for policy in South Africa is that the regulations for independent subsidised schools have resulted in the improvement of results in those schools. This however, has had a negative effect on the schools that are totally independent, as these poor performing schools then become independent schools or are closed. It is important to note that there is no monitoring of the performance in independent primary schools so benchmarking the sector is completely limited.

Another implication for policy is that whilst the South African government has encouraged participation in the independent schools by providing the schools with subsidies there are not sufficient mechanisms in place to monitor the performance of the sector. Independent schools also need to be closely monitored as the relative efficiency of these schools is dependent on the same factors as those in public schools. The subsidies need to become linked to more efficient inputs and not only outputs of education such as performance in the Senior Certificate Examination.

A final conclusion for this study is that both public and independent schools need to emulate at least some of the teaching, administrative and management processes in schools that produce consistently good results.

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Annexure 1: Levene Test

Test of Homogeneity of Variances

passrate

year	Levene Statistic	df1	df2	Sig.
2002	32.055	2	608	.000
2003	26.224	2	608	.000
2004	10.354	2	614	.000
2005	7.963	2	618	.000
2006	10.338	2	619	.000