

**DIFFERENTIALS IN SENIOR CERTIFICATE EXAMINATION
PERFORMANCE OF SCHOOLS IN TERMS OF PRE-1994
EDUCATION DEPARTMENTS**

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A research report submitted to the Faculty of Commerce, Law and Management, University of the Witwatersrand, in partial fulfillment of the requirements for the degree of Masters of Management (in the field of Public Policy)

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ABSTRACT

The research analysed the performance differentials among schools with different pre-1994 history of administration and provisioning thus examining the changes in terms of equality of educational outcomes. The purpose of this research was to contribute to the further understanding of the effectiveness of post-1994 educational policy reforms in addressing educational inequalities of the past.

The study found that not only were there statistically significant performance differentials between schools based on the pre-1994 education departments, these performance differentials remained significant throughout the period under study. The findings suggest that, overall, the performance differentials between schools that obtained in the pre-1994 era were continuing unabated. The study also found that there were significant performance differentials between schools within the former education departments and these were more significant in low performing former education departments. This suggested that schools within each of former education departments were not homogenous and more nuanced policy interventions were needed to ensure quality outcomes.

The study recommends makes three main recommendations. These are - shift in methodological approach when dealing with education policy where a school as an institution at macro level will be a point of departure as opposed to macro-level approach where broad educational reforms are imposed on schools; education policies should be such that they mitigate the impact of socio-economic background on learner achievement and; that future research need to focus on more nuanced aspects on school effectiveness rather than lumping schools into large groups which may hide unique quality challenges that schools as institutions are facing.

DECLARATION

I declare that this research report is my unaided work. It is submitted in partial fulfillment of the requirements of the degree of Master of Management (in the field of Public Policy) in the University of Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in any other university.

Mfelasakhe John Mahlangu

Date: March 2011

DEDICATION

I present this work in memory of my father, may his soul rest in peace, who together with my mother, without any education, sacrificed and managed, under sometimes difficult conditions, the meager family resources to feed my hunger for acquiring an education.

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LIST OF ABBREVIATIONS AND ACRONYMS

ABET	Adult Basic Education and Training
COLTS	Culture of Learning Teaching and Service
DBE	Department of Basic Education
DDSP	District Development and Support Project
DET	Department of Education and Training
EAZ	Education Action Zone
EEA	Employment of Educators Act
EMIS	Education Information Management System
FET	Further Education and Training
GET	General Education and Training
HOA	House of Assembly
HOD	House of Delegates
HOR	House of Representatives
JMB	Joint Matriculation Board
NEPA	National Education Policy Act
OECD	Organisation of Economic Cooperation and Development
PIRLS	Progress in International Reading and Literacy Study
QIDS UP	Quality Improvement, Development, Support and Upliftment Programme
QLP	Quality Learning Project
SACMEQ	Southern Africa Consortium for Monitoring Educational Quality
SAFCERT	South African Certification Council
SASA	South African Schools Act
SES	Socio-economic Status
SGT	Self-governing Territories
TIMSS	Trends in International Mathematics and Science Study
UNESCO	United Nations Educational, Scientific and Cultural Organisation
WCED	Western Cape Education Department

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CHAPTER ONE

GENERAL INTRODUCTION

1.1 Background and Context of Education in South Africa

This section will attempt to locate education in South Africa in a historical, social, political and economic context. In addition, it will briefly highlight the historical importance of the matriculation examination as a key milestone of educational attainment in the South African education system. This background will also assist to put into context the centrality of concepts such as equality, equity and redress in any analysis of the education system in South Africa.

1.1.1 Historical and Socio-Political Context

Right from the onset of the apartheid system in 1948, education was one of the main pillars of the government's segregationist ideology of separate development (Harrison, 2004, p.443). Different race groups were subjected to different types of education sub-systems within the one encompassing system called "National Christian Education". These separate systems were legislatively entrenched through the Bantu Education Act of 1953 for Africans and similar pieces of legislation for Coloureds and Indians in 1963 and 1965 respectively (ibid).

Both politically and socially, apartheid education was used as one of the tools of domination which were deliberately designed to facilitate the distortion of the "environmentally based social development of the indigenous populations" (Abdi, 2003, p.89).

According to Weber (2002, p.618), the design and the delivery of the apartheid education in terms of its nature, quality, and accessibility were crafted with social domination as a key objective. More specifically it was

designed to consolidate “white power and privilege while entrenching black oppression and domination” (ibid, p.619) The following quote attributed to HF Verwoerd who was then the Minister of Native Affairs captures essence of the social domination objective of the apartheid education: “When I have control over native education, I will reform it so natives will be taught from childhood that equality with Europeans was not for them” (cited in Abdi, 2003, p.93). The imperative for domination was therefore always going to be a key determinant in the distribution of education as a resource or a good among society.

The design of the apartheid system was such that it ensured that different racial groups assumed different political, social and economic roles in society along the continuum of superior to inferior. As Rakometsi (2010, p.22) states, the apartheid system constituted an elaborate policy of racial discrimination and segregation which not only ensured differentiation but also introduced a hierarchical classification of people based on skin colour. On one extreme was the white minority who assumed superior roles while on the other extreme was the African majority who were meant to assume inferior roles.

This hierarchical order was very much part of the provisioning of education as any other facet of life under apartheid. HF Verwoerd who was then the Minister of Native Affairs in the 1950s captured the essence of the apartheid education:

There is no place for the [Bantu] in the European community above the level of certain forms of labour...What is the use of teaching the Bantu child mathematics when it cannot use it in practice? That is quite absurd. Education must train people in accordance with their opportunities in life according to the sphere in which they live” (As quoted in Brian Lapping, 1997).

Education was therefore one of the key instruments used to ensure that the aims of the apartheid system such as domination of one group over others were fulfilled. Aspects such as education administration, curriculum and

resourcing (human, finance etc.) were distributed along racial lines. As a consequence the level of access to and quality of education varied among different groups with the white minority enjoying the highest levels of access and quality. These disparities were also reflected in levels of educational performance and overall achievement and attainment among different groups.

1.1.2 Socio-economic context

Bantu Education was designed to fulfil three general socio-economic policy priorities of apartheid as described by (Cross & Chisolm, 1990 cited in Abdi, 2003, p.92). Firstly, to serve the apartheid regime's need for the abundance of black labour to support the country's rapid growing economy at the time; Secondly, to pacify the large African urban underclass that was increasingly gathering on the fringes of the large metropolitan areas; Thirdly, to lessen the impact of truancy by young people that could radicalise the working class people. Bantu education was therefore never designed to ensure that Africans participated fully in the mainstream economy as entrepreneurs, professionals, and skilled workers but to keep them systematically in the lower rungs of economic activity mainly as providers of menial labour.

Nowhere is the legacy of these policies more apparent than in the nature of the distribution of skills, income and poverty among different groups. Studies conducted internationally have not only found that an individual's lifetime earning potential is highly dependent on their educational attainment but also that, in a nation, high achievement in education plays an important role in economic development (UNESCO, 2005, p.41). Van der Berg (2005, p.5) stated that the growing earnings function in South Africa and internationally showed a tight relationship between education and labour market status and earnings.

It is widely acknowledged that this legacy has resulted in serious structural problems and contradictions in terms of economic development in South Africa. For instance there is a co-existence mass unemployment and a acute skills shortage. This suggests that a large number of unemployed people do not possess the skills that the economy requires. As a result the majority of the people, mainly African, remain trapped in poverty with very slim chances of emerging out of that state. As a nation, South Africa's prospects of achieving higher levels of economic growth are hampered by the lack of skills.

1.1.3 Policy and legislative context

Successive separate development policies resulted in 19 different education systems towards the end of apartheid each managed differently with adjusted syllabi but all within the overall scope of central government control. There were 11 education systems for Africans made up of six "homeland" education departments (Gazankulu, Lebowa, Kangwane, KwaNdebele, KwaZulu and Qwaqwa), four "independent" education departments (Transkei, Bophuthatswana, Venda and Ciskei) and the Department of Education and Training (DET) which was responsible for the education of Africans outside the "homelands" and "independent states". Each department could develop its own system but the central white-controlled government retained high level of control through finance and common examination controlled by the DET (Weber, 2002, p.619).

The Constitutional changes in 1983 introduced three houses of parliament, the House of Delegates for Indians, the House of Representatives Coloureds (Gilmour, 2001, p.6) and the House of Assembly for whites. The latter house was the more powerful and had unequalled powers to make final determinations on policy and legislation. New education departments were then formed accordingly with white education assigned to the new Department of Education in the House of Assembly with the then four

provinces retaining the administrative role. Education of Africans outside the “homelands” and “independent states” remained under the control of the House of Assembly but administered separately under the DET (Weber, 2003, p.620).

Inherent in this highly segregated political and administrative system were marked differences in terms of key indicators of equity in education. By 1994 inequities were observed in many areas of the education system, e.g. 46% of Africans were un or under-qualified as compared to only 1% of white teachers; classroom shortages of about fifty to sixty-thousand in African areas, with most of existing structures in a state of disrepair; lack of single curriculum and thus as many as 1400 syllabi creating differences along race, gender and class, urban/rural variations and academic-vocational differences; quality and achievement outcomes reflected in low levels of learners reaching matric and pass rates for Africans compared to whites (Gilmour, 2002, p.8).

It is quite clear that the new democratic government elected in 1994 was faced with a mammoth task of transforming the education system. The concepts of equity and redress therefore emerged in the context of the challenges that the new government faced at the time. There was suddenly a realisation that introducing equitable distribution only would not be adequate without redress or some form of redistribution. Various policies and legislations on education flowing from the Constitution were enacted.

In South Africa, education is established as a right in the Constitution. The Bill of Rights in the Constitution of the Republic of South Africa, 1996 (No. 108 of 1996) provides as follows:

Everyone has a right:

- a) To a basic education, including adult basic education; and
- b) To further education, which the state, through reasonable measures, must make progressively available and accessible (section 29(1)).

This then puts an obligation on the state to provide education, in particular basic education, to all the citizens.

Through the National Education Policy Act of 1996 (NEPA), the Minister of Education, working with the provinces, sets the political agenda and determines the national norms and standards for education planning, provision, governance, monitoring and evaluation. The nine provincial departments of education are responsible for implementing education policy and programmes aligned with the national goals. They make funding decisions and exercise executive responsibility for all general education and training (GET) which covers grade R-9 and further education and training (FET) from grades 10-12 as well as for formal adult basic education and training (ABET).

This organisation has not only brought about administrative coherence, it has also ensured that a single system of education governed at national level where decisions on resourcing, funding, curriculum are taken. This has assisted in bringing about concurrence and uniformity in the governance of education.

While NEPA is concerned with overall governance of education and clarification of the roles and responsibilities of the education department, the South African Schools Act, No. 84 of 1996 (SASA) aims to provide for a uniform system for the organisation, governance and funding of schools. It seeks to ensure that all learners have right of access to quality education without discrimination. It regulates the provision of public schools and education places, the governance of schools (in particular the establishment and operation of school governing bodies), the funding of schools (including state responsibilities, school budgets, fees and the framework for funding rules or norms) and the establishment and funding of independent (private) schools.

In order to give effect to constitutional obligations on education, the SASA, through section 34(1) introduced the concepts of equity and redress in the funding of education. The Act states: “The State must fund public schools from public revenue on an equitable basis in order to ensure the proper exercise of the rights of learners to education and the redress of past inequalities in education provision”. To advance the concept of redress, the Constitutional clause which establishes the right to equality and affirmative action was referred to (Gilmour, 200, p.11).

The Norms and Standards for School Funding were introduced in 1998 in terms of the NEPA and SASA. These norms were based on the principles of equity and redress and meant that schools were given resources based on their particular socio-economic position. Schools were then allocated into quintiles starting from the poorest 20% to the least poor 20% and a targeted per learner expenditure was allocated for each quintile with the poorest schools receiving the highest and the least poor receiving the lowest allocations. The introduction of the norms represented the first real attempt to ensure equitable distribution of resources to schools, when previously the focus was on achieving fairness in the distribution of funding between the provinces given the large disparities in provincial budgets in 1994 (Wildeman, 2000, p.1).

The purpose of the Employment of Educators Act, 1998 (EEA) is stated as being “to provide for the employment of educators by the State, for the regulation of the conditions of service, discipline, retirement and discharge of educators and for matters connected therewith”. It also allows the national Minister of Education to make regulations regarding all matters related to the employment of educators including regulations on how educators should be equitably distributed among schools.

One of the regulations introduced through the EEA was the Norms and Standards for the Distribution of Educator Posts introduced in 1998. These norms were also based on the principles of equity and redress. Through a model, available posts were distributed equitably between schools based on a number of factors including the curriculum, medium of instruction, period load per subject and more. Most importantly, however, five percent of all available posts were reserved to be allocated according to the school's poverty level as defined in the Norms and Standards for School Funding.

It is quite clear therefore that policy and legislation introduced after 1994 was an attempt to respond to the challenges of the inequalities that were pervasive in society at the time.

1.1.4 Matriculation examinations in context

Filer (2000), in Ndaba (2004, p.2), distinguishes between two discourses on the role of assessment in education. The first is the technical discourse, which in essence views assessment as a technical and objective means of selecting, grading, comparing individuals and schools where the required ends are not in dispute. He further argues that in this discourse, technicalities such as test validity and reliability and the criterion and norm referencing are paramount. Once these technical requirements are fulfilled, confidence in the systems of assessment is maintained and thus the uses to which the results are put are legitimised. The sociological perspective on the other hand, questions the very uses of the results or the actual ends. This perspective recognises that in addition to their educational or technical use, results of an assessment fulfil a range of social and political functions within society.

Ndaba (2004, p.3) argues that policy and assessment debates rarely venture into the fundamental issues concerning the social functions and outcomes of assessment with the focus of discourse being on the technical aspect of assessment. Hence debates around the matriculation examinations and their use have largely been around the quality concepts such as reliability, validity, and standards.

Lubisi and Murphy (2002) trace back the history of matriculation examinations and related quality control focus to the establishment of the Joint Matriculation Board (JMB) in 1916. At its formation, it had a sole right of running matriculation examinations which were at the time university entrance exams for universities of South Africa, Cape Town, and Stellenbosch. It was only later that provinces were granted the right to conduct examinations purely for matriculation purposes starting with the Transvaal in 1921, the Cape in 1923 and Natal much later in 1953 (Trümpelmann, 1991 in Lubisi and Murphy, 2002). After this development the JMB resumed a new role of a quality controller. The JMB kept a tight control on these examination bodies to ensure that their examinations were of a comparable standard to those set by itself.

It must be noted however, that throughout this period the examination setting was racially based in line with the schooling system in general. The JMB was eventually replaced by the South African Certification Council (SAFCERT) in 1992 which was in turn replaced by the current Council for General and Further Education and Training known as uMalusi in 2002. The role of all these bodies has, however, consistently been that of maintaining the integrity of and confidence in the examination system.

One other consistent factor throughout this history has been suspicions of political manipulation of the matriculation results at one point or another by the government in collusion with the standards setting bodies. For instance

there were allegations that SAFCERT, in order to compensate for poor provisioning and quality in the former Department of Education and Training (DET) and homeland schools and the resultant poor performance, was forced to adjust raw marks upwardly in excess of accepted practice in order to present a more favourable picture of the these systems (Lolwana, 2004 in Ndaba (2004, p.3). A similar allegation was raised about the seeming leniency that the JMB applied to the homeland administrations to give an impression that the education systems in the homelands were working. Similarly, in 2003, uMalusi was also suspected of manipulation of the results due to alleged political influence (Chisolm, 2004, p.1).

According to Lubisi and Murphy (2002, p.262) matriculation examination has been perceived to have various roles, *inter alia*, as a gatekeeper to employment and higher education (King & Van der Berg, 1992; Lubisi, 1999) and to suit socio-economic and political development of South Africa by the apartheid government (Mathonsi,1988). However, despite the debates and suspicions of political meddling, the matriculation examination has always been held at high esteem by the public both from the sides of the previously advantaged and disadvantaged. Ndaba (2004, p.3) argues that its currency results from the its long history and legitimation as the most important qualification while (King & Van der Berg,1992, p.8 in Lubisi & Murphy, 2002), contend that it is largely because it was and is seen to represent a signpost of achievement.

Therefore both the technical and sociological discourses around the matriculation examination are critical in understanding its role in society both from the historical and current perspectives.

1.2 Introduction to the problem

Historically, the end of schooling assessment generally known as the matriculation examination has been used as a yardstick for both educational performance and achievement. Passing matriculation means that an individual has achieved a particular milestone in their education. Also, the level of performance achieved by an individual in the exam itself has specific consequences in terms of his/her future career options. It has “wide currency in the higher education sector, the employment market, and amongst parents and the general public” (Taylor 2006, p.3). However, the performance in the examination also has significance at a school level in terms of the overall pass rate for a school. School pass rates reflect the rate of success of individual schools in facilitating that individuals achieve an important milestone in his/her education and in life. Therefore the higher the pass rate the more successful an individual school is in ensuring that more learners achieve this milestone.

In the past, cross-sectional studies in this field examined the disparities in performance in terms of school pass rates at matriculation among different race and socio-economic groups (see Fedderke, De Kadt & Luiz, 2000; Crouch, 2000; Crouch, Van der Berg & Burger 2003; Oosthuizen & Bhorat, 2006; Motala, 2006; Crouch, Gustafson & Lavado, 2009). In her study Motala (2008) stated that these studies were mainly concerned with linking inputs to outcomes by identifying input variables that impact on inequality. The study by Motala herself was aimed at defining which inputs are important and also whether or not there is equity in the distribution of such inputs.

The problem can therefore be briefly stated as follows:

One of the critical education policy objectives of the post-apartheid government was to ensure equality in the provisioning of education in order to address the inequalities of the past and thus the realisation of equal

educational opportunity. It is imperative that an evaluation of the progress made towards the objective of equal educational opportunity should not only focus on the equality of educational inputs but also include an analysis of the equality in educational outcomes. Previous studies that have examined educational outcomes have indeed found that inequality in educational outcomes continued in the post-apartheid schooling system. However, these studies have not only been few they have also been cross-sectional in nature. There is therefore a need for studies that are longitudinal in nature in order to determine trends over time. Knowledge generated from these studies provides policy makers with much richer information regarding the performance of policies over time.

1.3 Purpose of the study and research questions

While previous research on the subject has focused on examining the magnitude of the performance gap at a particular point in time, this study examines and compares the gap at five different points (2000, 2002, 2004, 2007 and 2009) over time. The study uses the year 2000 as a base year although it would have been ideal to use 1996 which was the first year in which a truly national and non-racial (single education department and single curriculum) examination was written (Kanjee, 2004, pp.6-7). This is purely due to the difficulty of acquiring data that would have been compatible with the data from 2000 and beyond. The author, however, believes that this could also work to the advantage of the study as most of the legislative changes between 1994 and 1998 could be expected to have had impact from the beginning of the year 2000.

The purpose of this research is to analyse the outcome differentials among schools with different pre-1994 history of administration and provisioning. This is with the view to contribute towards further understanding of the effectiveness of the post-1994 policy reforms in addressing the inequalities

of the past. This will be done through analysing and comparing one of the key indicators of school level performance, namely the school level matriculation pass rate.

The main research question attempts to examine the extent of the performance differentials among schools in terms of senior certificate pass rates categorised according to the pre-1994 departments or former education departments and most importantly asks whether or not such performance differentials have changed significantly in the period under study.

To explore the main question further, the following questions will be addressed:

- What are the performance differentials between the different former education departments?
- What are the performance differentials between schools within the former departments?

1.4 Significance of the study

Throughout the post-apartheid period, debates in the public arena have been raging on performance of the education system with the main focus being around the quality of education as defined by certain “standards” that needed to be upheld.

Two main indicators have been integral in sparking these debates. Firstly, it debates around the quality of education rage on annually immediately after the release of the matriculation results. Secondly, South Africa participates international comparative studies (TIMSS, SACMEQ and PIRLS studies) on aspects such as literacy and numeracy at lower grades of schooling. Consistent poor performance of South African learners in these

comparative tests also become a subject much analysis and debates around the quality of education in the country.

As Chisolm (2004, p.4) noted, due to their political nature, the debates on matriculation results were at times ludicrous in that the low matriculation pass rate would at one time be used as evidence of poor “standards” and high pass rates used at another time as evidence of the same. While quality is important, it merely addresses the characteristics such as the intrinsic value and functionality of education as opposed to equality of outcomes which talks to sameness which is related to quantity. In the context of equity and redress quality is assumed in that if the inputs are allocated fairly to achieve equality in outcomes then those outcomes must also be of the same quality. In other words regardless of the quality of education, all groups must have an equal educational opportunity.

Therefore while the debate on quality is important the policy imperatives of achieving equal outcomes between groups must also be evaluated. More analysis is therefore needed on the aspect of equality of outcomes. This is also important if one notes that equality is a societal value entrenched in the Constitution.

1.5 Conceptual framework

The thrust of policies on the distribution resources in public education has been on addressing the disparities of the past. The concepts of equity and redress thus became the central policy imperatives. Equity and redress are mainly concerned with ensuring equitable distribution of resources with a bias towards the previously disadvantaged. Implied in this, implicitly or explicitly, is the expectation that these policies will lead to equality of outcomes.

This study conceptualises equity and redress as stated in the policies from the perspective of contributions from political philosophy (Motala, 2006, p.12). In this perspective these policies are viewed as attempts to ensure equal educational opportunity as defined by Fiske and Ladd (2004); Evettes (1970) and Motala (2006). This conception allows for positive discrimination in order to advance groups that have been or are disadvantaged by not the realities of their educational ability but the fact that they socially, economically or otherwise belong to a particular group.

This study further extends the conceptualisation of equal educational opportunity to the expectation of equal educational outcome as further defined by Fiske and Ladd (2004) hence the examination of school matriculation pass rates as a key outcome indicator.

1.6 Structure of the Report

This report comprises of six chapters. **Chapter One** presents a general introduction of the study in a form of two sections. It firstly provides the context of the study through a brief historical context of education in South Africa examining the political, social, economic and legislative factors. It also highlights significance of matriculation examinations and results in the South African context. Based on this context, it then introduces the study by defining the problem, clarifying the purpose, explaining the significance of the study and briefly stating the conceptual framework upon which the study is based.

Chapter Two reviews literature relevant to the topic by firstly exploring some theory and conceptualisation of the key concepts. It then focuses on the literature and previous studies conducted around equity, redress, quality and equal educational opportunity.

Chapter Three focuses on research methods by highlighting the approaches followed, the techniques used to analyse data and the data used in relation to an attempt to respond to the research questions.

Chapter Four presents, in an analytical manner, the findings of the study. It uses various techniques and measures to attempt to provide evidence that will assist in answering the research questions.

Chapter Five deals with the analysis and the interpretation of the findings

Chapter Six tackles the conclusions and recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This Chapter will focus on the literature and theoretical perspectives relevant to the concepts of equity, redress and equality in the public education system. Firstly, the concepts of equity, redress and equality will be conceptualised in order to clarify were used in this research in the context of policy aims in public education. Secondly, the concept of educational quality and policy attempts made to achieve quality will be examined.

Thirdly, the review will consider what other researchers have found regarding progress towards equality of education in South Africa. Fourthly, the main contentions about the factors that determine educational achievement will be considered. A body of empirical research has been built over the years to establish the factors that really matter in ensuring improvement of learner achievement.

Finally, the literature review will briefly discuss school financing. Most of the inputs into educational provisioning revolve around funding. The distribution of funding remains one of the key considerations in education resourcing and therefore funding remains one of the key consideration when examining equity and redress in education.

2.2 Defining equity, redress, equality and quality

This subsection will attempt to provide short definitions of terms: equity, redress, equality and quality. These terms will be conceptualised further in the following sections.

In simple terms equity refers to that which is just or fair and in this context it means a fair distribution of resources. According to Motala (2006, p.2) the definition of “equity” can be further expanded to what is socially just and attempts to address unequal outcomes. In this way equity defines the specificity of inequality and thus can advocate for a process of differential distribution to achieve its goals. The latter part of the definition advocates differential distribution or what some call positive discrimination which could be used as a definition for redress. Equality means sameness or lack of discrimination in a public policy context and it is more about the outcomes than the inputs (Secada, 1989 as cited in Motala, 2006, p.7). While “equality” speaks to the sameness “quality” speaks to the inherent characteristics of the outcomes in relation to features viewed as important e.g. functionality and value.

2.3 Theory and conceptualisation of equity and redress

Fiske and Ladd (2005, p.2) state that the one of the major tasks of the democratic government that assumed power in South Africa in 1994 was to promote racial equity in the state education system . Firstly, in the context of South Africa, the obligation of the state to provide education to all is enshrined in the Constitution. This, by implication, raises an obligation for the state to ensure that not only is education adequately resourced but also that there is an equitable distribution of educational resources.

The concept of redress is contextual in that it relates to the historical nature of unequal distribution of educational resources during the apartheid era. The two concepts, equity and redress as, defined above, seem to be at odds. While equity suggests that all should be treated equally, redress simply refers to that the levelling of playing the field where some, because of their being disadvantaged in the past, should be brought to the par with those that have been advantaged, thus suggesting unequal or preferential treatment. The questions that arise include whether or not, in practice, it is

possible to pursue policies that advocate both ideals and secondly, it is possible also to ensure quality education for all in the face of these competing ideals.

Fiske and Ladd (2005) view the concept of racial equity in education in the South African context in terms of three conceptions which they argue that although they had not been used to analyse the South African equity reforms they were nevertheless well recognised in international literature of education reforms. Firstly, racial equity conceived as *equal treatment* of persons of all races. This relates to the issues of open access to educational facilities and the equal distribution of educational resources which in this context would mean “race-blindness” (Fiske & Ladd, 2005, p.3).

The second conception is that which views equity in the South African context as *equal educational opportunity* for learners of all races and socio-economic backgrounds. Writing as far back as in 1970, Evettes (1970) argued that challenges raised by the notion of equal educational opportunity are both practical, that is, how to achieve equal opportunities and philosophical relating to general inter-determinacy of educational aims. She further argued that as far as differential educational achievement does not reflect differential abilities, the education system was both socially unjust and economically wasteful. Thus, one of the most important tasks of the education system is to give each child an equal opportunity to realise his/her innate potential regardless of irrelevant factors such as class, race, income, religion or other social disadvantage. This in essence captures the conception of equal educational opportunity in that ideally an education system should afford each and every learner an opportunity to perform to his or her true potential.

Evettes (1970, p.431) further calls for a new interpretation, which takes into context the reality, which calls not for equal schooling, because it is practically impossible, but for positive discrimination in favour of educationally underprivileged children or compensatory education. The latter interpretation is in line with the current policies on education resource provisioning of the government of South Africa which are based on the concept of equity and redress in the distribution of resources in order to achieve equality of outcome. Redress being the compensatory aspect that Evettes refers to.

Fiske and Ladd (2005, p.6) argue that the concept of equal educational opportunity could, in principle, be defined in terms of equal educational outcomes, on average, for learners of all races. They, however, further argue that this definition would be far more demanding in the context of South Africa in that other factors such as family income and educational attainment still have influence on the ability of black learners to perform to the level of white learners. They then settle for a contextual definition, which looks at the quality of education that learners of different races receive. This means that they focus on input factors such as investment in education, quality of educators etc. Implicit in this argument is that factors outside the school do matter in the determination learner achievement. This point will be further discussed below when considering issues around determinants of learner performance.

Finally equity as conceived as *educational adequacy* relates to need for the education system to ensure that all the learners achieve a level of education adequate to “equip them to function as workers and citizens in the new democratic era or to participate fully in the economic life of the country” (Fiske and Ladd, 2005, p.5). While the focus of measurement in the equal opportunity concept is measurement of achievement between races or groups, here the measurement is concerned with whether each

learner can achieve results in terms of the standards set. In this era of globalisation mean both national and global competitiveness.

Literature on the progress South Africa has made towards achieving equity in education has also used the three conceptions of equity in education as discussed above. There is seemingly an overwhelming convergence among different authors considered in this review regarding the areas of progress or the lack thereof. All the studies seem to agree that while South Africa had achieved or had progressed in achieving equity as in equal treatment little or no progress has been made in terms of equity as equal educational opportunity and equity as educational adequacy (Fiske & Ladd, 2004, p.248). Consistent with the focus of this research one will consider how the argument rose in regard to the issues around equity as conceived as equal educational opportunity.

Fiske and Ladd (2004) using data of up to 2002 at national level and comparison between provinces found that there were some improvements, albeit limited, in terms of progress towards equal educational opportunity. Their focus was on resource allocation in relation to the number of classrooms thus learner: educator ratios, distribution of media centres and teacher qualifications as indication of the quality of education. Crouch (2005) using the School Register of Needs (department of education census of schools) data of 1996 and 2000 looked at distribution of learner-educator ratio and the distribution of learner-classroom ratios.

The analysis found mixed results in that improvement was noted in terms of teacher allocation but not in terms of classroom allocation. Also less improvement was found in terms of equity in allocation of equipment. He further examined educational outcomes in terms of learner performance. He found that there was improvement in equity in terms of pass rates from 1997 to 2001 from a Gini co-efficient of 0.36 to 0.25. Also found was that

such an improvement was much better than the country's Gini co-efficient in the distribution of income.

In closing this section it is important to note that while this study is more concerned about equal educational opportunity, educational adequacy is also key particularly when one considers that not all learners are exposed to same levels of quality (regardless of the extent of that quality). The discussion that follows will examine the concepts of quality and equality in the context of this research study.

2.4 Quality or Educational Adequacy and Equality

It is important to contextualize the issue of quality or educational adequacy and particularly highlight some of the attempts that have been made to improve quality of school education in South Africa. Most importantly, this section attempts to delineate the concepts of quality and equality as there is a tendency among to discuss these concepts in a rather unclear manner. Put simply, the argument is that in the presence of equality, quality or the lack thereof should be observed equally across all subjects of investigation, in this context, learners and schools.

Generally there has been improvement in the national matric pass rates since 2000 after a decline that lasted from 1994 to 1999. While some have attributed the upward swing to the improvement in the quality of education others point to the lowering of the standards. Crouch and Vinjevold (2006, p.13) argued that the decline could be attributed to several factors including changes that led to a single provincial education departments where learners of races wrote the same papers. This, they argued, changed cognitive demands in particular for African learners as evidenced in the drop in pass rates. Also there was a drop in number of "exemptions" or university entrance qualification and in higher grade passes for mathematics and science. More than reference to quality and standards,

this argument also alludes to the issue of inequality in achievement albeit without a clear delineation of the concepts.

Important to note is that South Africa has performed dismally on international comparative tests such as SACMEQ, PIRLS and TIMSS on literacy and numeracy at lower grades of the schooling system, pointing to the overall poor quality of education in South Africa by international standards (Crouch and Vinjevold, 2006 and Soudien, 2007). Furthermore, Crouch and Vinjevold (2006, p.13) stated that while standards have been lowered at school level, tertiary institutions, in particular Universities have maintained high standards, hence lower enrolment rates at Universities.

It is however also important to note that a deeper analysis of the results of the international tests revealed that hidden in the aggregate figures was serious inequalities in achievement among schools serving learners from different backgrounds. For instance Taylor (2006, p.2), examining the Maths and Reading results of the 2005 SACMEQ study observed that South Africa had the highest degree of inequality between schools among fourteen African countries that took part in the study. This was shown by variance in scores between high-and low-SES schools whereby South Africa had on, average three times the differences as other countries.

Several interventions have since been undertaken to improve the quality of education although the focus has been on the latter years, in particular to improve the matriculation results. These initiatives are referred to as school Improvement programmes in literature (Taylor, 2006, p.6). These interventions focussed on both aggregate pass rates, quality as defined as quantity of exemption passes and passes in so-called difficult subjects such as mathematics and sciences. These school improvement programmes were largely based on what Taylor (2006, p.6) referred to as research on school effectiveness and they emanated both from government and

private/non-profit sectors.

Crouch and Vinjevold (2006) examined various interventions undertaken by government starting with the attempts to stem the early declines in pass rates (1994-1999). The introduction of the Culture of Learning Teaching and Service (COLTS) was aimed at returning the culture of learning and teaching particularly in African dominated schools which was lost during the latter of the struggle against apartheid.

Furthermore in 2001 a new campaign to address high failure rates at schools was started. It involved setting national targets for pass rates and targeting time management and teaching and learning in poorly performing schools or schools that achieved fewer than 20% pass rates. Crouch and Vinjevold (2006, p.14) argued that while this intervention achieved success in a short time there were unintended consequences mainly stemming from how provincial education department chose to deal with the pressure to meet targets set. There was suddenly a decline in learners sitting for examinations as some learners were held back deliberately in grades 10 and 11 and most learners who eventually wrote were encouraged to take certain subjects at standard grade level.

Crouch and Vinjevold (2006, p.13) state that concerns that the cognitive demands of matric examinations were in decline reached high levels in 2003. This led to the action by uMalusi (quality assurance body for secondary schools) to conduct a research, which eventually found that there was, indeed, a decline in cognitive demands in some papers. Examiners were then requested to increase cognitive demands of examination papers from 2004 onwards, hence slight declines in pass rates in 2004 and 2005. Other campaigns introduced since 2004 included the introduction of a new curriculum for grade 10-12; the National Learner Attainment Strategy which aimed to intervene in poor performing school

where African learners are a majority and; expansion of the number of specialised schools for mathematics and science (Dinaledi schools).

Taylor (2006) discusses evaluations of school improvement programmes initiated by both the private/non-profit and government sectors by type of initiative. He identified three types of school improvement programmes, which were, the teacher and school-focussed initiatives also known as “inside-out approaches”; standards-based reforms also known as “outside-in approaches” and; the systemic approaches.

Under the teacher and school focussed initiatives two projects were considered. The Imbewu project (1998-2001) working with 523 rural schools in the Eastern Cape focussed on teacher and principal training concentrated on the principles and methods of learner-centred teaching and outcomes-based education. The evaluations of this project found that there was a positive response from the part of parents, principals and teachers (Perold, 1999 in Taylor 2006); principals and teachers reported higher levels of understanding of Curriculum 2005 but no learning gains in reading, writing and mathematics (Schollar 2001, in Taylor 2006).

The Learning for Living project working with 898 primary schools across the nine provinces was larger and longer than Imbewu and had a different focus in that it was focused on training teachers and principals in teaching reading (Taylor, 2006, p.7). In addition, classrooms were visited to support and monitor the work of teachers, and supplied target schools with books and reading material (ibid). The evaluation of this project showed covariant gains of 8.4 % in reading and 5.3% in writing compared to a set of control schools (Schollar, 2005 in Taylor 2006).

The standards-based approach discussed by Taylor (2006) is the Education Action Zone (EAZ) programme adopted by the Gauteng

Department of Education in 2000. This programme was in response to the standard-based approach initiated by the government in 2001 as discussed above in relation to the work of Crouch and Vinjevold. The programme was designed to improve the working of the system which included monitoring schools and providing support to and training to principals, teachers and the support to learners. The evaluation (Fleisch, 2003 in Taylor 2006) found that the results of the intervention were impressive in that the results in targeted schools rose both in absolute sense and relative to non-EAZ schools. However, Taylor (2006, p.8) observed that the standards-based approaches focussed on accountability measures than systemic or quality improvements and they tended to defeat the purpose of their design.

The third approach takes a holistic approach which looks at systemic improvements. It “involves aligning curriculum, teaching and assessment through the coordination of activity at the levels of the classroom, school, and the bureaucracy at district and higher levels” (Taylor, 2006, p.8). It also involves the setting of targets, monitoring of performance and offering of support in the form of training and resources. Three projects using approach were considered, these were, the District Development and Support Project (DDSP) implemented between 2000 and 2002; the Quality Learning Project (QLP) implemented between 2000 and 2004 and; the Dinaledi project.

The DDSP project was implemented in four poorest provinces in the country working with 453 primary schools. Interventions were directed at improving the functionality of districts and schools and improving classroom teaching in language and mathematics. Objective tests of learner performance in literacy and numeracy at grade 3 level were conducted in each of the three years of the project and a year later (the fourth year). Significant improvements which held steady in all the test years were observed. Taylor (2006, p.9) argued that although the improvements

appeared impressive, in the absence of control scores, the significance of these improvements could not be ascertained.

The QLP which was funded by the Business Trust worked with 524 poor and largely rural high schools selected by the nine provincial education departments. Similar to the DDSP the QLP was focussed on the training and support programmes aimed at improving management of districts and schools and improving classroom teaching. The evaluation conducted by the HSRC found that the targeted schools achieved significantly better results in matriculation examination than selected control schools in terms of greater numbers of overall passes, university exemptions and passes in mathematics and English (Taylor, 2006, p.10).

Further analysis also showed that the interventions of QLP affected the functionality of the system in districts, schools and classrooms. Taylor, (2006, p.11) observed that improvement in terms of functionality was less than expected and this was attributed to instability in the district establishments wherein 13 of 17 districts were restructured at least once during the life of the project. He further argues that lack of any notable improvement in lower grades was as a result of a pressure on schools to show performance at matriculation level and lack of monitoring by districts.

The third systemic improvement programme that Taylor examined was the Dinaledi project which focussed on 102 poor high schools across the country spearheaded by the national Department of Education and implemented between 2001 and 2004. The aim was to make these selected high schools centres of excellence in terms mathematics and science. The support provided to these selected schools included training to teachers and principals and provision of learning materials. According Taylor (2006, p.12) although the results were on average better than the national averages, most schools in the Dinaledi remained in the poor

performing category albeit better than before the intervention. Also noted was that the participation of provinces and support from districts was limited especially given that the project was managed nationally. The Dinaledi project was re-launched in 2004 with an increase in number of focus schools increased to 400 high schools and different criteria used to identify the new schools. The main feature of the new criteria was that schools were selected on the basis that they were already better performing or had a potential to benefit from the intervention. This project is still running to the present and number has since been increased to 500 high schools.

This analysis would not be complete without mentioning the Quality Improvement, Development, Support and Improvement Programmed known as QIDS UP introduced in 2006. Although there are currently no evaluations done on this programme, it remains one of the biggest interventions by government focussing of improving the conditions in poor schools. At its inception it was intended at providing educator and district development support to 5000 low performing primary schools, and in so doing to improve children's learning, especially their literacy and numeracy skills. It was projected to cost R12.5 billion over the first five years (Department of Education, 2006a in OECD, 2008, p.94). Targeted resources and support was in the form of libraries, laboratories, teaching materials and teacher training, and the emphasis on maths, science and technology (ibid, p.186). The aim was to later extend the programme to under-performing secondary schools.

The common thread in the discussion on the quality of education and attempts to improve such quality is that there was an acknowledgement that there was a lack of equality among schools in relation to certain inputs that were believed to be critical to achieve quality learning and teaching in those affected schools. Achieving quality of education was thus not

conceptualised as something independent of the equality in the provisioning of outputs.

As seen in the discussion above, all the interventions were based on the assumption that certain inputs be it at school, district and classroom level were critical to improve quality as defined as learner achievement. The next section will review literature on determinants of learner achievement on which many school improvement interventions are based.

2.5 Studies on the determinants of learner achievement

As this research will focus on the issue of equal educational opportunity in terms of equality in the educational outcome or simply learner performance as expressed in school pass rates, it is inevitable that one has to examine literature regarding determinants of learner achievement. This is a difficult terrain to tread on, as it is fraught with inconclusive debates. In their study Haegeland, Oddbjorn and Salvanes (2004) divided factors that determine learner achievement into two main categories, which are, school-based and outside school-based factors. This section will consider a few international and local studies conducted in this field.

According to Haegeland *et al* (2004, p.5) the modern literature on the effects of school organization and resources on learner achievement started in 1966 triggered by the Coleman Report where data on school inputs, socio-economic background and test scores was collected in the United States of America (USA). The study concluded that socio-economic background matters the most in learner achievement. However, research that followed this pioneering study yielded mixed results.

Haegeland *et al* (2004) conducted among learners aged 16 across 11 school subjects in Norway. After controlling for family background they found a positive but modest effect of resource quantity such as teacher

hours per learner on learner achievement. They also found that teacher quality and other teacher characteristics did not have any impact on learner marks.

A study by Wenglinsky (1997) conducted in the USA collected data on student academic achievement, types of per pupil expenditure for the school district, social environment of the school, teacher-student ratios, teacher education levels, the socio-economic status of students and the cost of education in the region. The aim of the study was to examine the relationship between expenditure at schools and educational outcomes. The study looked at learners in fourth and eighth grades. The study found that expenditure can affect achievement of fourth graders in two steps and of eighth graders in three steps Wenglinsky (ibid, p.16)

For fourth graders:

Step1: Increased expenditure on instruction and school district administration increased learner-educator ratios

Step 2: Increased learner-educator ratios raised average achievement.

And it affects fourth graders in three steps:

Step1: Increased expenditure on instruction and school district administration increased learner-educator ratios

Step 2: Increased learner-educator ratios reduced the problem behaviours and improved the social environment of the school

Step3: A lack of problem behaviours among students and a positive social environment raised average achievement in mathematics.

Also found in the same study was that variations in other expenditures and resources were not associated with variations in achievement. These were capital outlays on facility construction and maintenance, school level (principal's office) administration and teacher education.

The important point about this study is that the authors argue that there is a need to look at a productivity perspective in that not all spending leads to better educational outcomes. Therefore policy makers need to establish which areas of spending will lead to better results.

One other international study conducted by Roscigno, Tomaskovic-Devey, Crowley (2006) in the USA, is worth noting due to its relevance as one of the perspectives of research in South Africa. The study found that learners living in rural areas and inner city exhibit lower educational achievement and higher propensity to drop out of high school than do their sub-urban counterparts. In their research they integrated literature on spatial stratification and educational outcomes to examine how local advantages and disadvantages can continue to perpetuate inequalities despite attempts to achieve equality through using education policy tools. It draws distinction between resources available to learners and investment decisions made by parents and schools in terms of the utilisation of such resources within the constraints of resource availability.

In South Africa the resources that government make available to schools and thus their investments are expected to be similar across all geographical areas (in the USA school resources are based on local taxes). The availability of parental resources and thus their investment, however, takes pattern along the lines of local opportunity or socio-economic circumstances. This simply means that South Africa, due to school funding policies, where all schools are funded equitably based on the nationally applied norms, has a better opportunity to alleviate inequalities both in terms of the availability and the investment of resources at school level. However, as Motala (2008) in her study looking at whether the current funding policy contributed to equality and equity in education concluded that while equality as defined as equalisation in the distribution of funding was achieved, the achievement of equity or what is socially just

was hampered by factors such as resource backlogs in some schools.

Another study by Kingdon (1999), which was conducted in India concluded that both the home background and school influences were important in India. This study also took into consideration among other factors, a school type in order to factor in managerial type influences. In this study it was found that, of all the school based factors, school resources (materials and facilities), length of instruction time per week, school management type (state or private) and teachers' own cognitive skills were key to learner achievement. Furthermore it was found that class size, teacher training, experience and teacher's years of education were not important to learner achievement. Also found was that home background explained more than 50% of learner achievement and thus the conclusion that overall both school and home background factors do matter in learner achievement.

Different studies conducted in South Africa have yielded inconclusive result with some finding that both learner background and school factors are equally important in determining learner achievement. On one hand, Crouch (2005, p.8) argues that research on determinants of learner achievement in South Africa is at best inconclusive. On the other hand, Taylor (2006, p.10) states that most studies done in South Africa on the subject have found that socio-economic factors have the largest influence on educational opportunity. He cites a number of studies, (Crouch & Mabogoane, 2001; Thomas,1996; Anderson *et al.*, 2001; Simkins & Patterson, 2002; Van der Berg & Berger, 2002 and; Howie, 2002), which concluded that factors such as race, parental education, parental income, and language are key determinants of educational performance.

However, Reschovsky (2004, p.24) quotes other two studies that were conducted using the South African data. In a study by Anne Case and Angus Deaton, after controlling for learner family background, found that in

South Africa class size (L: E ratio) was negatively related to educational attainment (measured as years of schooling completed) for blacks. In the same study they also found that class size was significantly related to student performance in mathematics standardised tests.

Another study conducted by Borat and Oosthuizen (2006) was aimed at examining the relationship between learner performance and five inputs using the 2000 grade 12 data. These were school characteristics; teacher quality; household characteristics; child and parent characteristics. This study looked at the analysis at individual level and was at the time the first study to do so as most studies looked at the analysis at school level. The study concluded that, firstly, the teacher- pupil ratio was insignificant in explaining pass rates for schools below 80th percentile performance. Secondly, physical resources, except for the presence of classrooms built with bricks and mortar did not make any difference in matric performance.

Thirdly, knowledge infrastructure, in particular computers for teaching was important in understanding the absolute and relative performance of schools. Fourthly, teacher and parent characteristics also came out strongly. However, household vulnerability was found to be a weaker predictor of success. This study therefore suggested that both school-based and socio-economic factors combined to explain learner performance.

In their study van der Berg and Burger (2003) hypothesized that schools in poor communities do not overcome human capital backlogs on any appreciable scale due to a combination of inadequate resources and inefficiency in the allocation of resources. Put alternatively, after standardising for socio-economic background to what extent school performance is determined by availability of resources or what part is rather to be explained by inefficiency of resource use. In this study inefficiency was inferred mainly from nature and magnitude of residual part of school

performance that was not accounted for by socio-economic background and availability of resources.

The study used the national and Western Cape matriculation results for 1999 and 2002 and the resource allocation data, namely, the pupil-teacher ratio, physical resources, teacher quantity and quality. In their study they concluded that resource allocation did not have a significant influence on performance of schools serving predominantly black and coloured schools. They thus inferred that managerial efficiency was more important and that any attempt to add more resources will not yield any significant improvement unless the issue of managerial efficiency was addressed. This suggests that although both socio-economic and school-based resources were critical in explaining learner performance, the level of efficiency with which the resources were utilised was even more critical.

Another study which arrived at similar conclusions is worth discussing. This study was conducted in the Western Cape in 2003 among grade 6 learners as a joint initiative between the Western Cape Education Department (WCED) and the Joint Education Trust (JET) (van der Berg, Burger and Yu, 2005). It involved a numeracy and literacy test administered on grade 6 learners in sample schools; gathering of household data on the concerned learners; school management data in sample schools and; classroom data involving the observation of the teaching of mathematics and language. This was supplemented by the Census data on socio-economic profile of the learners' neighbourhoods and some data on language composition, school fees, former education department, and poverty of the school community available at the education department. The study was premised on the recognition and acceptance of the impact of poverty or socio-economic factors on schooling outcomes and focussed on examining how school and classroom factors could minimise such an impact.

The findings of the study as summarised in Taylor (2006, p.15) indicated that factors that were critical to effective learning were, at home, speaking the language of learning and teaching, signing of and assisting with homework and reading; at school, regulation of time, monitoring and supporting curriculum planning and delivery, procurement of books and stationery; in class, adjusting pace to learner ability, teacher knowledge and complete curriculum coverage. The analysis concluded that to a large extent income and geography remained the most important determinants of the quality of education a young South African would receive. Most importantly the finding that there were more differences in performance between schools than between individuals suggested that schools were not helping to bridge the gap in achievement that result from socio-economic factors (van der Berg *et al.* 2005, p.17).

A number of papers have also been produced in this field of study, mainly authored by education economists, based on the analysis of the SACMEQ data of 2000 all focusing on determinants of learner performance. Two recent analysis of the SACMEQ data help to indicate the centrality of a school as an institution that can bridge the socio-economic disadvantage in learner performance.

Van der Berg and Louw (2008) conducted an analysis of the 2000 SACMEQ data in regional context. This, in a way, was an attempt to confront the question as to why South African learners seem to perform poorer in international tests than learners in countries which have a far less per capita expenditure on education. The analysis was aimed at disentangling the relationship between learner and school socio-economic status (SES) through examining the effect of teacher quality and school management variables (Van der Berg & Louw, 2007, p.2). Using the regional data, the study showed that the poor performance of the South

African schooling could not be attributed to resource availability or even poverty of households from which the learners came.

One of the key findings regarding the relationship between SES and learner performance was that while the SES showed no significant impact on learner performance for the poorest 60% of the learners, there was a steep positive relationship between the SES and performance in the upper 40% of the learners. The authors concluded that given the schools quality in South Africa was positively related to family background, schools quality was critical in ensuring that affluent learners were more able to benefit from their SES. In other words higher SES would only benefit learners if they attended affluent schools. Further, the study identified that school quality factors, in particular, teacher absenteeism, principal's monitoring of learner progress and teacher quality interacted with socio-economic background to determine performance.

Another study using the SACMEQ data (van der Berg, 2008) reached similar conclusions as the study above. However, one particular aspect of this study is worth mentioning. In addition to using a full data covering all schools and learners part of the analysis used a reduced data focussing on formerly disadvantaged schools in order to analyse the variations among individuals in these schools. The data showed that even learners from the middle class backgrounds were did not perform well when they were outside the schools for the rich.

While there is clearly a lack of consensus on specific list of factors that determine educational outcome, there is a greater degree of consensus that factors both inside and outside school do matter in influencing educational outcomes. While earlier analyses in most instances came to the conclusion that outside school factors were critical in determining learner performance, later analyses began to delve deeper into the in

school factors in order to examine how these factors could contribute towards mitigating the impact of socio-economic background.

2.6 Funding of education

Policies and approaches on the funding of education are critical in any examination of issues around the distribution of educational resources. Funding of education remains the main pillar around which all the other resourcing is build. According Reschovsky (2004, p.21) in 1994 a major challenge facing the new government of South Africa in education was to amalgamate 19 separate and unequal race-based education systems into one education system. More than the challenge of structural re-organisation however, was the fact that the school funding in the previous education system was very unequal. In 1993 the learner-educator ratios of white and black school were at 1:15-20 and 1: 50-60 respectively with per learner spending seven times greater for white than black learners. Such differences translated to differences in aspects such as teacher salaries, physical facilities, and equipment. Clearly in order to achieve equal spending, more funds were required to ensure that while increasing expenditure for previously poorly funded a reasonable standard is maintained for previously well-funded schools.

According to (Wildeman, 2001, p.2), the focus of the funding policies between 1994-1999 was to achieve inter-provincial equity in education funding which involved the redistribution of funds from better-off provincial departments to poor ones. This was facilitated by the Function Committee system through which the national Minister could play a direct role in provincial budgetary allocations (ibid). This resulted in provinces like Limpopo and Eastern Cape increasing their spending by 49.4% and 36.9% respectively from the 1995/96 and 1996/1997 financial years while Gauteng and Western Cape saw very little growth.

The introduction of the National Norms and Standards for School Funding “norms” in 1999/2000 ensured that the focus was now targeted at intra-provincial or allocation between schools. It should be mentioned, however, that even at that stage the inter-provincial equity in distribution of funds had not been achieved. As Wildeman (2001, p.2) noted that when the norms were implemented in 2001 vast funding gaps were seen with Gauteng and the Northern Cape having more favourable allocation overall than other provinces. However at that stage, in 2001, (ibid, p.10) also found that, overall, the increase in funds made available to implement the new norms far outpaced the inflation

Also, Reschovsky (2004, p.27) found that an overall per learner expenditure between 1994 and 2004 rose from R2222 to R5011 amounting to 12% real increase (after adjustment for inflation) over that period. Reschovsky argues that even at 2004 the issue of inter-provincial inequalities in terms of per learner expenditure had not been overcome but it was also found that differences among provinces between 1994 and 2004 as measured by the co-efficient of variation was reduced by 60% (ibid, p.25).

The norms for school funding are intended to guide the distribution of recurrent non-personnel funds between schools. This is aimed at school level expenditure with the funds distributed according to the norms limited to three categories of expenditure, namely the maintenance of school buildings, municipal utilities and most importantly Learner Support Materials which included text books, teaching equipment and media collections. These categories cover some of the key input areas at school level. Also important to note is that funds allocated for this purpose are made up of a remainder from the total pool of funds after salary commitments had been met. This amount is sometimes referred to as redistributive base. Wildeman (2000, p.8) argues that, the size of the salary

bill in relation to the total budget is therefore a major determinant of what gets left for redistributive purposes in terms of the norms and is to a large extent determined by the efficiencies of each province.

2.7 Conclusions

The conceptualisation of equity and redress suggests a causal relationship with equality in that equitable distribution of resources is expected to lead to equality of outcomes. Thus the aim of introducing equity in the distribution of resources is to influence inequalities of outcomes. There is also concurrence that in order to achieve equity there is an argument for positive discrimination where more resources are allocated to the disadvantaged sectors of the education system.

There is, however, a view that it is practically impossible to guarantee equal educational outcomes as other factors outside the school and thus outside the ambit of policy influence, such as socio-economic background of the learners tend to have an impact on outcomes. This view suggests that rather than focussing on outcomes, policy should aim at ensuring that quality inputs are distributed at school level. This view seems to have resigned to the fact that equality of outcome is not achievable.

However, research on determinants of learner achievements has been, largely, inconclusive with some studies finding that in school factors matter more while others finding that outside school factors matter more. It was quite clear, however, that both factors do have an impact and thus policies should also try to minimise the negative impact of outside school factors.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This research employed quantitative methods of research and statistical techniques were applied to analyse the secondary data. According to van der Berg (2005, p.4), studies in this field are normally referred to as education production function analysis studies and imported into analysis of education outcomes from the field of econometrics. In the field of education the production function analysis seeks to measure the impact of each educational input to student achievement levels and other educational outcomes. It applies statistical techniques such as regression analysis to databases of students or schools and statistically measures the relationship or correlations between various economic, social and other inputs and academic achievement (Wenglinsky, 1997, p.10).

3.2 Research approach

Quantitative research paradigm, as opposed to qualitative which is ethnographic and interpretive in nature, is empirical in nature (Atieno, 2009, p.1). While the qualitative paradigm ensures validity by attempting to study the whole phenomenon in order to evaluate its complexity and ensure that the conclusion reached takes into account both unique and general factors, the quantitative paradigm does so by the process of rigorous clarification, definition or use of pilot experiments (Atieno, 2009, p.1). This approach could be further sub-classified into inferential, experimental and simulation approaches to research (ibid).

The difference between quantitative and qualitative research paradigm is not along exploratory-confirmatory or inductive-deductive dimensions and thus methodological (Atieno, 2009, p.3). Rather it is more philosophical with debates being around epistemological assumptions, generalisability and

authentic representation of the phenomenon under research (Atieno, 2009, p.3; Pole, 2007, p.35).

One of the key differences between the quantitative and qualitative research paradigms is the primary focus of research. Quantitative research paradigm is more focused on outcome or product while the qualitative paradigm focus is on process (Atieno, 2009, p.2; Ismail, 2006, p.3) or grounded on process theory (Pole, 2007, p.35). One therefore needs to locate the focus of the research based on the research question in order to choose between the two paradigms. The method to be used depends on the nature of questions to be answered (Ismail, 2005, p.1; Pole, 2007, p.36).

This research also drew from the education production function research tradition borrowed from economics which is concerned about the relationship between inputs and outcomes in education (Monk, 1989, p.32). Monk argues that the goal of the contemporary research tradition on production function is to “apply economic reasoning to the manifold instances of resource allocation that have bearing on educational activities” (ibid, p.38).

3.3 Research design

The research adopted a causal-comparative design. According to Frankael and Wallen, (2000, p.393) a causal-comparative approach allows a researcher to attempt to determine the cause or consequences of differences that already exist between or among groups. This method is used where an independent variable is not amenable to manipulation as would be the case with the experimental design (Schenker & Rumrill, 2004, p.117).

The most important aspect of causal-comparative studies is that they examine the magnitude of differences between and among groups but no attempt is made to infer causality within an individual study (Schenker & Rumrill, 2004, p.117). The research was mainly concerned with examining the magnitude of differences among different schools based on their set historical categorisation.

The focus of the study was more on describing the differences and less on attempting to determine the cause and effect of such differences. Furthermore the study adopted a longitudinal approach whereby the performance of each school will be examined over a period of time. This means that only schools with a complete history for the period under review will be included in the analysis.

3.4 Data collection

3.4.1 Secondary data

The research will use the data of matriculation examination results, in particular the school pass rate for the years 2000, 2002, 2004, 2007 and 2009. The basic unit of analysis was the school, with the main variable (dependent) of analysis or measurement being percentage pass rate per school. The choice of the baseline year of 2000 and the subsequent years (2000, 2002, 2004, 2007, and 2009) was mainly due to the availability of data, data compatibility, and accuracy of data.

This data was sourced from the Department of Basic Education (DBE) examinations section. However, the examinations results dataset did not contain the variable that identified the pre-1994 education department to which a school belonged. This data was sourced through the Education Management Information Systems (EMIS) section in the DBE from the "Schools' Master List" database. Using Microsoft Access the two datasets were merged with the examinations data through unique records

(examination centre number and centre name).

3.4.2 Sampling

The study used purposive sampling approach. Firstly, the study focused on the population of ordinary public schools to the exclusion of independent schools. The main reasoning is that a funding policy dispensation that applies to the latter schools is different. Also, public ordinary schools amount to more than 94% of all ordinary schools that are either fully state-funded or receive some form of subsidy from the state. Secondly, new schools that were introduced after 1994 were also excluded as the research is interested in schools that existed pre-1994 and still existed in 2009. Thirdly and most importantly, the main analysis was only on schools that had a complete history. These are the schools that had registered candidates for senior certificate in all the years under review.

Work to create a dataset for the research included the following activities. The first step involved the creation of the 2000 baseline data. This involved the merging of the examinations and schools master list in order using the unique identifiers (centre name and centre number). The variables former department and school sector (public or independent) were then obtained from the schools master list. The next step was to remove all new schools and independent schools from the 2000 base data. This 2000 base line data comprised of 5212 schools that all existed pre-1994 and were divided into 14 former education departments.

The schools were further grouped into six categories which are the former House of Assembly (HOA) or former white schools; House of Delegates (HOD) or former Indian schools, House of Representatives (HOR) former coloured schools, Department of Education and Training (DET) or former African schools in areas that were part of central government; Self-governing Territories (SGT) or schools that were in six self-governing

territories areas and Independent States (IS) or schools that were in the four independent states.

The 2000 list formed the basis for identifying the rest of the schools for the remainder of the years under review. The final list used for the study comprised of 3734 public schools which is about 72% of the base list of 2000. Over a quarter (28%) of the schools from the original list were dropped for various reasons, the main one being that they did not have full history or consistently register full-time candidates for all the years under review. Others reasons include school closures and mergers.

3.4.3 Data analysis

The analysis of data was structured in such a way that information was organised to assist in answering the research questions. The following two questions served as a two main themes of analysis.

- What are the performance differentials between the different former education departments?
- What are the performance differentials between schools within the former departments?

The study used both descriptive and inferential statistics to analyse the data. In addition to the standard descriptive statistics, the Kernel density estimator was used to present and describe the distribution of pass rates per former department. The Gini co-efficient which is a measure of inequality was used to measure and describe overall inequality in performance between the former departments and most importantly the performance inequalities within the former departments or between schools with the former departments.

As stated before, this research is anchored within the tradition of production function analysis which relies mainly on the regression analysis techniques

to determine levels of correlation. The Ordinary Least Squares (OLS) was used to examine the magnitude and the significance of the performance differentials between former departments. The correlation analysis was used to interpret the relationship between pass rate and former departments. Two measures were used. One, the coefficient of determination (r^2), which is a summary measure or index of the amount of variation in the dependent variable explained by the independent variable. The second is the correlation coefficient or coefficient of variation (r) which tells about the direction (positive or negative) and the strength of the relationship (McBurny & White 2007, p.393). To test the significance of the differentials the confidence interval was set at 95% in all cases.

In order to determine whether the differentials were significant over the period under study the Repeated Measures Analysis of Variance (RM ANOVA) technique was used.

The combination of these techniques were assisted in providing the analysis required to respond to the research questions

3.4.4 Validity and reliability

According to Schenker and Rumrill (2004, p.118), the causal-comparative designs lack control of most extraneous variables that may also influence the between-group differences. They further state that these designs provide a limited cause and effect relationships as opposed to experimental designs where the manipulation of independent variables could allow a researcher to conclude with some degree of certainty that the effect of an independent variable on the dependent variable had a causative effect. The research can only conclude that the groups differ with respect to that variable. Thus they lack in internal validity.

Therefore establishing external validity becomes even more important if the causal-comparative approach is being used. External validity is established based on degree to which the sample is representative of the larger population from which the sample was drawn (Schenker & Rumrill, 2004, p.119). As indicated before the final research dataset represented the 72% of the original population of public schools that registered learners at senior certificate level.

3.5 Limitations of the study

The limitation of research is that it used the matriculation data of 2000 as a baseline. It would have been more ideal to use the 1996 data as baseline in that this was the last year in which matriculation examination were wrote under the old system. This was, however, not possible due to the issues of availability of matriculation data before 2000 and its format compatibility with the data from 2000 and onwards.

Furthermore the study would have been enriched if additional independent variables such as economic status and race were used in the analysis thereby widening the analysis. However, due to the fact that the study spans across nine years, these data were not consistently available throughout the period. Noting, however that the use of one independent variable, the former education department, was also advantageous as it allowed for deeper analysis.

CHAPTER FOUR

PRESENTATION OF THE FINDINGS

This Chapter will present the results of the research and is supported by Appendices B and C.

4.1 Introduction

This Chapter will present the findings of the research on the differentials in performance among the schools as categorised in terms of their historical or pre-1994 departments. The unit of analysis is the school level matriculation pass rate. In line with the research questions, the presentation of the findings will, overall, take a form wherein the performance differentials among the former education departments primarily and within the former education departments secondarily are emphasized. The performance differentials are also examined, particularly as they relate to trends over the years under review.

Furthermore, the results will be presented at two levels. Firstly, the results of each year under review will be presented using descriptive statistics and visual presentations starting with the base year (2000). For each of the following years, the presentation of the results will be linked or compared to those of the preceding year to establish general trends both in terms of between and within the former education departments pass rates. Two summary statistics, the mean and the standard deviation were used to describe the results supported by the visual presentations comparing the pass rate distribution using the Kernel density distribution plots and the decile distribution graphs to describe the distribution further.

At the second level, the summarised or composite result will be presented using both the descriptive and inferential statistics. The Gini co-efficient

was used to describe the relative inequality in the distribution of pass rates both overall and within each former education department. The regression analysis techniques (Ordinary List of Squares and Multiple Analysis of Variance) was used to determine existence of performance differentials between and within former departments, their magnitude and most importantly whether or not they were statistically significant.

4.2 Presentation of the results for each year under review

4.2.1 School pass rates in 2000

Table 1 displays the basic descriptive statistics for the year 2000 of the school pass rate for each of the former education departments. As it can be seen the average pass rate for former HOA schools is the highest at 95% while the average pass rate at the former SGT schools is the lowest at 47% which is about half the average pass rate at former HOA schools. The average pass rate at the former HOR schools is the second highest at 73.3%, closely followed by the pass rate at former HOD schools at 72.6%. Further lower are the average pass rates at former IS and DET at 49.9% and 49.7% respectively, at only about 2% above the lowest average and also below the overall of average of 55%.

TABLE 1: Basic Descriptive Statistics 2000

Former Department	Number of schools	Mean (%)	Standard Deviation
HOA	433	95%	11.7
HOR	196	73.3%	18.8
HOD	112	72.6%	17.5
DET	860	49.9%	22.8
IS	671	49.7%	23.1
SGT	1462	47%	22.4
Overall	3734	55.8%	26.4

Note: By the author from the research dataset (2010)

A closer look at the average pass rates in Table 1 shows three groups of almost distinct distribution patterns with the former HOA the highest followed by the former HOR and HOD closer together and at the lower end the former DET, IS and SGT schools closer together.

The second important statistic that will further help with comparison is the standard deviation. The standard deviation is a single number that represents a spread of a distribution. This is quite critical as the secondary aim of this research is also to look at the performance differentials within each of the former education departments. The standard deviation for the former HOA schools is the lowest, suggesting that the majority of the schools' average pass rates are relatively closer to the mean than are the other schools pass rates relative to the average in each of the rest of the former education departments. There is a relatively large variability in the pass rates in the former DET, IS and SGT schools at 22.8, 23.1 and 22.4 respectively.

Once again the three group pattern of distribution can be noticed from the standard deviation statistic with the former HOA showing the lowest variability followed by the former HOR and HOD closer together at mid range and the DET, IS and SGT showing the most variability. Interestingly, the overall standard deviation taking into account all the pass rates is much higher than those of the individual groups. This reflects a large average deviation in pass rates between the HOA, the HOR and HOD on the higher end of the distribution and the DET, IS and SGT on the lower end.

The Kernel density distribution plots presented in Figure 1 depict the graphical representation of the distribution of school pass rates per former education department. The distributions were plotted in one graph to enable the comparison of the pass rate distribution patterns of former education departments.

Three distinct patterns forming three groups can once again be noted. The first group consists of former DET, IS and SGT schools. The distribution of pass rates for these schools tends to be skewed toward the lower end of the distribution, peaking at around 40% on the horizontal scale and height of about 0.15 on the vertical scale (density). The DET and the IS show a small hump at the top end of the distribution though to a far lesser degree as compared to the overall distribution. Also noticeable is an indication of bi-modality in the distribution of the IS school pass rates with the first higher peak at 40% and a lower peak at 70%.

The second apparent group is that of former HOR and HOD schools. The distribution of pass rates of this group of schools differs substantially from that of the first group in that it shows skewness to the right or the top end of the distribution. This indicates that proportionately more schools attain higher pass rates than the former DET, IS SGT group of schools. The only factor distinguishing the pattern of distribution between the former HOD and HOR is that, although the pattern is generally similar, they tend to peak at different levels with the former HOD peaking at around 70% and the former HOR at 90%.

The third group of schools is that of former HOA schools. The distribution of pass rates for these schools is also substantially different from that of the first two groups. Such is the difference that it needed to be plotted on a separate, slightly larger vertical axis on the right. Very few former HOA schools attained a pass rate of less than 90%.

The Kernel distribution plot of the overall distribution also reflects the marked differentials with a clear bi-modal distribution pattern characterised by a dense distribution in the 20%-60% range accounting for the low average pass rates for the former DET, IS and SGT and the thick tail accounting for the high averages of the former HOA schools.

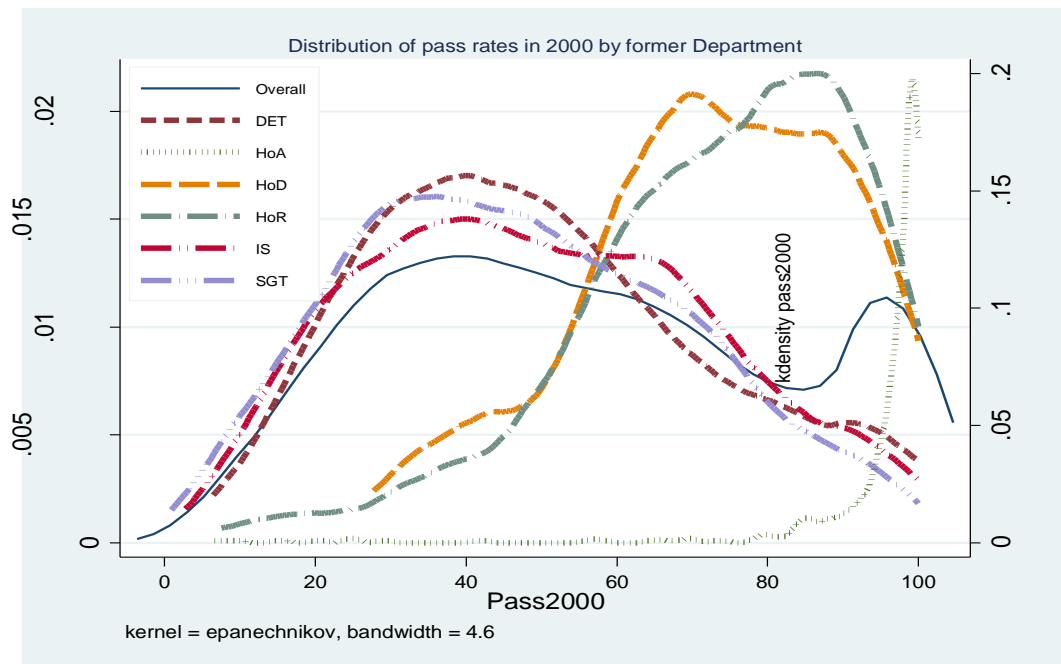


Figure 1: Kernel density distribution plots of school pass rates in year 2000 per former education department. By the author from the research dataset (2010)

To elaborate further on the description of the school pass rates in 2000, the distribution of pass rates by former education department per decile or per intervals of ten are presented in Figure 2. The pattern of distribution which shows three almost distinct groups can also be observed. To illustrate the differentials between the three groups the distribution of pass rates in the first five, the last two and final deciles will be examined. The purpose here is to examine the distribution of pass rates for each former education department per decile or intervals of ten. That is, a percentage of pass rates for each former education department that falls within each of the ten intervals (deciles) was calculated and plotted in the stacked bar graph. This allowed for a comparison of pass rate distribution per deciles or per intervals of ten.

The distribution pattern of the former DET, IS and SGT group of schools is almost similar, characterised by an even distribution of passes across all deciles but fewer schools in the last five deciles. On average about 54% of

the school pass rates in this group of schools are found in the first five deciles or are 50% and below. On average only about 10% of the school pass rates in this group are found in the last two deciles or 80% and above while only about 6% are found in the last decile or achieved 90% and more.

In the second group of schools that comprises schools in the former HOD and HOR only about 11% of the school pass rates are found in the first five deciles or have obtained a pass rate of 50% and below which is five times better than the performance of the first group (former DET, IS and SGT). Furthermore, about 40% of the school pass rates in the group comprising of former HOD and HOA are found in the last two deciles and this is about four times better than the first group. Lastly, about 18% of the school pass rates in this group are found in the last decile or are at 90% and more which is three time better than the attainment in the first group.

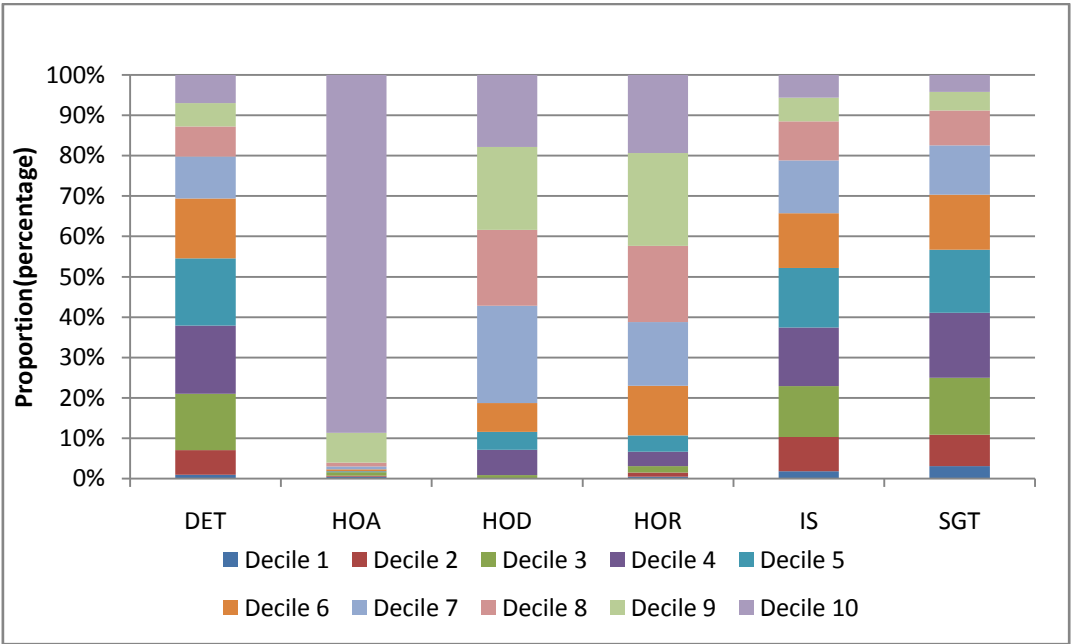


Figure 2: Distribution of pass rates in year 2000 by decile per former education department. By the author from the research dataset (2010)

Once again the third group of schools, the former HOA, shows a substantially different picture to each of the previous two groups. Only

about 2% of the school pass rates in this group are found in the first five deciles or 50% and below which is almost 22 times better than the performance of the first group and almost five times better than the second group's performance. About 96% of the school pass rates in this group are found in the last two deciles which is just over nine times better than the first group and just over two times better than the second group. Lastly, about 88% of the school pass rates are found in the last decile or are 90% and more which is about 16 times better than the first group and just over four times better than the second group.

4.2.2 School pass rates in 2002

The overall pass rates in 2002 improved to 68% from 55% in 2000. In addition to the tracing of the three group pattern of distribution, the analysis here will also look at how the increase of 13% was distributed among the former education departments particularly examining whether it was able to close the gaps or performance differentials observed in 2000.

Table 2 summarises the basic descriptive statistics for the year 2002 of the school pass rate for each of the former education departments. As it can be seen the average pass rate at former HOA schools is the highest at 96% while the average pass rate at the former IS schools is the lowest at 54% which is just over half the average pass rate at former HOA schools. The average pass at the former HOD schools is second at 85% closely followed by the former HOR schools at 79%. Further low is the average pass rates at former DET and SGT at 65% and 66% respectively. A closer look at the pass rates shows three groups, though with slight positional changes within the groups. The positional changes in the DET, IS and SGT saw the IS recording the lowest pass rates in 2002 while the SGT recorded the lowest in 2000. Also the gap between the DET and SGT and the IS widened. Similarly while the second group consisting of the former HOD and HOR was still noticeable the latter recorded the lower percentage in

2002 and the gap between the two widened slightly.

From this observation of average pass rates, it would seem the former DET, SGT and the HOD schools accounted for most of the improvement in the overall pass rate.

TABLE 2: *Basic Descriptive Statistics 2002*

Former Dept	Number of Schools	Mean	Standard Deviation
HOA	433	96.0%	10.7
HOD	112	85.2%	13.2
HOR	196	79.0%	15.1
DET	859	65.0%	20.7
SGT	1462	66.0%	22.2
IS	671	54.0%	25.3
Overall	3733	68.2%	24.1

Note: By the author from the research dataset (2010)

Generally, the deviation in the overall pass rate and within the former education departments decreased with only the IS recording a higher standard deviation than in 2000. Also important to note is that in former education departments that showed a relatively large improvement in pass rates (DET, SGT and HOD) also showed less deviation.

Although the Kernel density distribution plots in Figure 3 continues to reflect the pattern of distribution of three groups identified above, the within group variations as observed in the summary statistics above can also be seen. In the group that consists of the former DET, SGT and IS, it is quite clear that while the distributions for the former DET and SGT have improved, peaking at around 60% and skewing towards the top end, as compared to 2000 the situation remained unchanged for the former IS schools still peaking at around 40%.

The gap in the distribution pattern in the second group that comprises the former HOR and HOD can also be observed. Although in both cases the

pass rates peak at around 90%, the peak for the former HOD is higher at a density of 0.04 as compared the 0.025 for the former HOR. The notable observation regarding the third group, the former HOA, is that proportionately more schools achieved around 100% pass rate than in 2000 as shown by the higher peak at about 2.8 densities as as opposed to about 2.0.

The Kernel density distribution plot of the overall distribution also reflects the marked improvements in distribution as shown by a less bi-modal distribution pattern although with a hump at the top end of the distribution reflecting the HOD and the HOA distribution patterns.

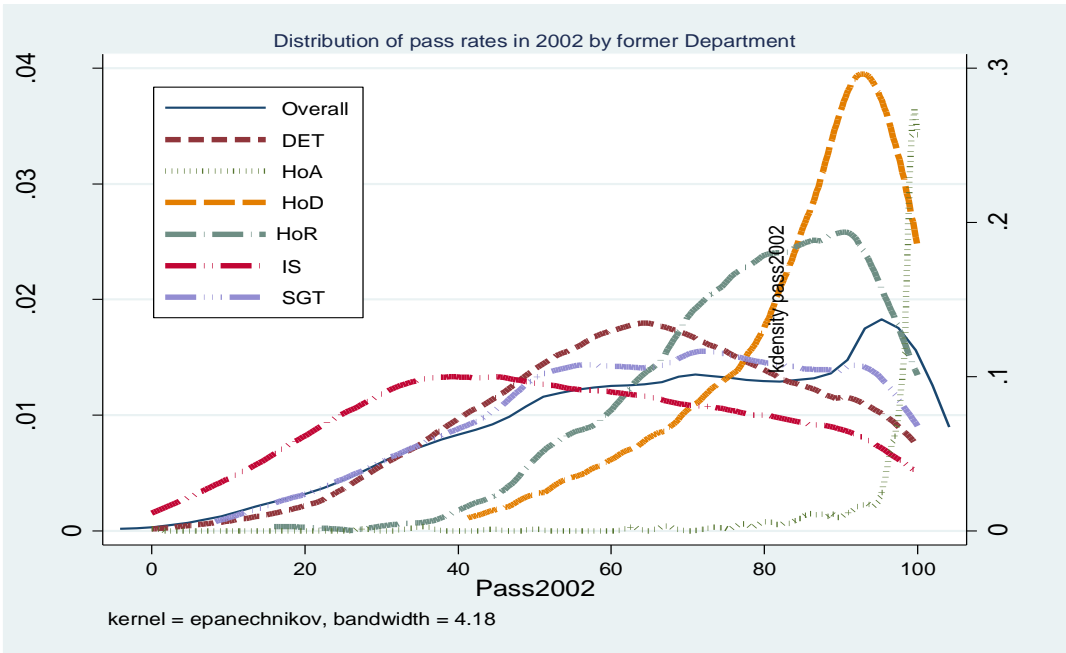


Figure 3: Kernel density distribution plots of school pass rates in year 2002 per former education department. By the author from the research dataset (2010)

The decile distribution of the pass rates per former education department for 2002 is presented in Figure 4. To illustrate the differentials between the three groups the distribution of pass rates in the first five, then last two and last two deciles will be examined.

The distribution pattern of the former DET, IS and SGT group of schools is almost similar, characterised by an even distribution of pass rates in the last five deciles. However the pass rate distribution gap between the former DET and SGT and the IS can be seen with the former IS having almost 45% of the school pass rates in the first five deciles while the former DET and SGT are at 25% and 24%. This shows an improvement from the 54% observed in 2000. The pass rates found in the last two deciles for the former DET, IS and SGT are 26%, 20% and 30% respectively also showing an improvement from the average 10% observed in 2000.

In the second group schools which comprises schools in the former HOD and HOR only about 2% and 5% of the school pass rates respectively are found in the first five deciles or have obtained a pass rate of 50% and below which is five times better than the performance of the first group. Also about 72% (HOD) and 51% (HOR) of the school pass rates in this group are found in the last two deciles which is just over two times better than the first group. Lastly, about 47% (HOD) and 25% (HOR) of the school pass rates in this group are found in the last decile or are at 90% and more which is three time better than the attainment in the first group.

The distribution in the former HOA shows a substantially different picture to each of the previous two groups. Only about 2% of the school pass rates in this group are found in the first five deciles or are 50% and below which is almost 12 times better than the performance of the DET and SGT and 22 times better than the former IS. About 96% of the school pass rates in this group are found in the last two deciles which is just over three times better than the average of the first group and just under two times better than the average of the second group. Lastly, about 88% of the school pass rates are found in the last decile or are 90% and more which is about four times better than the average of the first group and just under two times better than the second group.

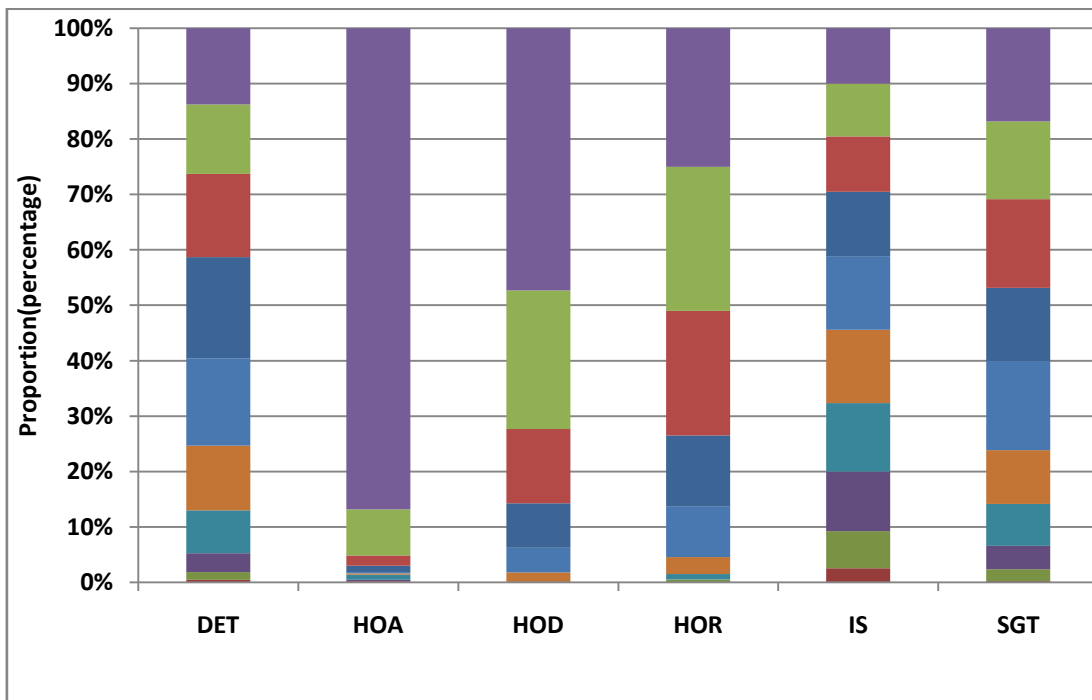


Figure 4: Distribution of pass rates in year 2002 by decile per former education department. Note: By the author from the research dataset (2010)

In conclusion two new observations in the 2002 as compared to 2000 have been made. However, the changed patterns of distribution were observed within the former IS, SGT and IS and the former HOA and HOD groups while on the whole the three group pattern held.

4.2.3 School pass rates in 2004

Table 3 displays the basic descriptive statistics for the year 2004 of the school pass rate for each of the former education departments. The overall pass rate is marginally higher than that observed in 2002 at 70.6%. A closer examination of the average pass rates per former education department statistics also reveal that the pattern of three groups of distribution that was striking in 2000 and began to diminish in 2002 appears to be further weakening in 2004. A clear gap in average pass rate developed between the former DET (67.8%) and SGT (69.7%) and the former IS (54.1%) breaking the pattern that was clearly observable in 2000

and to a lesser extent in 2002. Also, the gap in average pass rates between the former HOR (79.1%) and HOD (90.2%) further widened in 2004 taking the latter closer to the former HOA (95.9) which had remained constant from 2000.

Generally, there were no substantial differences in the standard deviations between 2002 and 2004 with only the former HOD continuing to show improvement by showing marked reduction.

TABLE 3: *Basic Descriptive Statistics 2004*

Former Department	Number of Schools	Mean	Standard Deviation
HOA	433	95.9%	9.1
HOD	112	90.2%	9.9
HOR	196	79.1%	16.0
DET	860	67.8%	20.3
SGT	1462	69.7%	20.8
IS	671	54.1%	24.6
Overall	3734	70.6%	23.2

Note: By the author from the research dataset (2010)

The diminishing pattern of the three group distribution can also be observed in the Kernel density distribution plots in *Figure 5*. Five different distribution shapes can be observed with only the DET and the SGT sharing a similar shape and distribution. Also clear are the gaps in distribution patterns which were also shown by the descriptive statistics above. The distribution plot for the former IS peaks at around 30%-50% with a steady downward sloping towards the top end of the vertical scale while that of the former DET and SGT peaks at between 70%-90%.

Notable about the comparison between the distributions for former HOR and HOD is that not only do they peak at different points across the horizontal, at around 85% and 95% respectively, but also up the vertical

scale, at just over 0.02 and about 0.06 respectively. Overall the former HOD maintained a steady incline which began in 2004. The distribution of average pass marks for the former HOA remained comparable to 2000 and 2004 showing remarkable consistency over these periods.

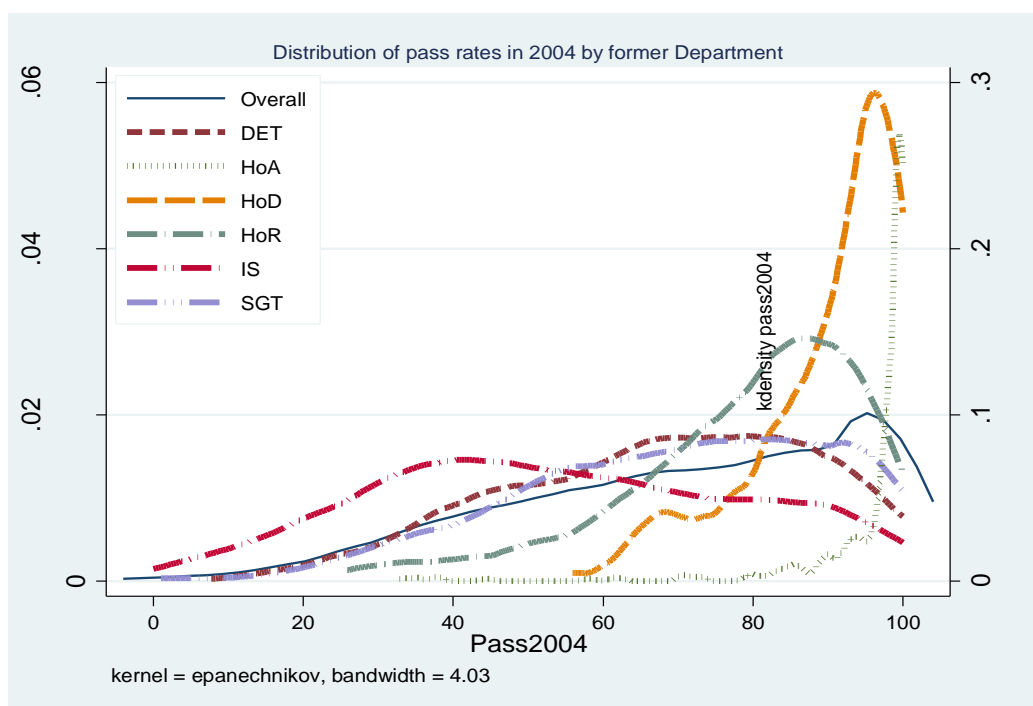


Figure 5: Kernel density distribution plots of school pass rates in year 2004 by former education department. By the author from the research dataset (2010)

The decile distribution of the pass rates per former education department for 2004 is presented in Graph 6. The distribution pattern of the former DET, IS and SGT group of schools is almost similar, characterised by an even distribution of pass rates in the last five deciles each. However the pass rate distribution gap between the former DET and SGT and the IS can be seen with the former IS having almost 45% of the school pass rates in the first five deciles while the former DET and SGT having 21% and 18% respectively in those deciles. This shows an improvement from 2002 for both the former DET and SGT while the former IS remained the same at 45%. The pass rates found in the last two deciles for the former DET, SGT

and IS are 33%, 36% and 20% respectively also showing an improvement from 2002 for the former DET and SGT with former IS remaining the same and 14%, 20% and 9% respectively are found the in the last decile.

The ever growing gap between the former HOD and HOR is also noticeable in the decile distributions of 2004. While 6.1% of pass rates for former HOR are found in the first five deciles no pass rates from the former HOD were found. However, both the former HOD and HOR performed much better than the former DET, SGT and substantially better than the former IS. Also about 83% (HOD) and 57% (HOR) of the school pass rates in this group are found in the last two deciles. This also is still substantially better than the former DET, IS and SGT performance. Lastly, about 63% (HOD) and 27% (HOR) of the school pass rates in this group are found in the last decile or are at 90%.

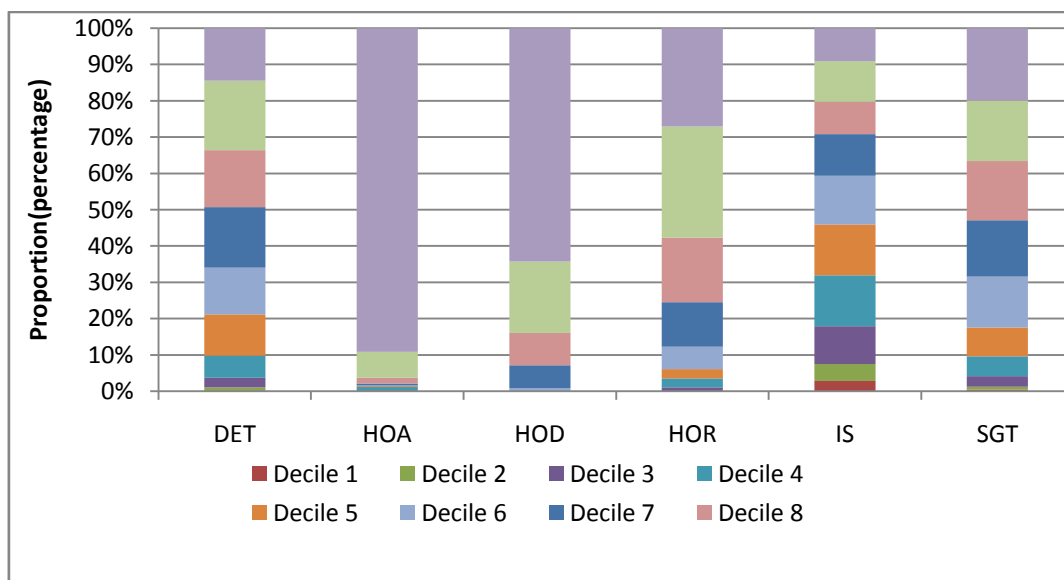


Figure 6: Distribution of pass rates in year 2004 by decile per former education department. By the author from the research dataset (2010)

Once again the former HOA pass rates continued with the consistent trend in 2004. Only 1.4% of the school pass rates of the former HOA are found in the first five deciles or is 50% and below which is almost 12 times better

than the performance of the SGT and DET and 30 times better than the former IS. About 96% of the school pass rates in the former HOD are found in the last two deciles which is just over four times better than the average of the former DET, SGT and IS. Lastly, about 90% of the school pass rates are found in the last decile or are 90% and more which is more than four times better than the average of the DET, IS and SGT.

4.2.4 School pass rates in 2007

Table 4 displays the basic descriptive statistics for the year 2007 of the school pass rate for each of the former education departments. The overall pass rate is lower than that observed in 2004 at 65%. A closer examination of the pass rate averages per former education department reveals that all but the IS had gone down from the 2004 averages albeit at different rates. However, the pass rate averages continued with the 2004 pattern with the only difference being that the average for the former SGT moved closer to that of the IS and further away from that of the DET as was the case in 2004.

TABLE 4: *Basic Descriptive Statistics 2007*

Former Department	Number of schools	Mean	Standard Deviation
HOA	433	94.4%	11.9
HOD	112	86.6%	12.7
HOR	196	71.7%	16.5
DET	860	63.2%	20.8
SGT	1462	58.7%	21.7
IS	671	56.5%	22.2
Overall	3734	65.0%	23.5

Note: By the author from the research dataset (2010)

The former SGT had the highest reduction from the 2004 average at 11%, then HOR (7.3), DET (4.3), HOD (3.8) and HOA (2.4) with only the former IS going up by 2.4%. The gap in average pass rates between the former

HOR (71.1%) and HOD (86.6%) further widened in 2007. In fact for the first time in this analysis the averages for the former HOR moved closer to the DET than it was to the HOD above.

The Kernel density distribution plots in Figure 7 clearly show the overall downward trend. A closer examination of the former education department plots shows four as opposed to five different distribution shapes. The distributions for the former DET, SGT and IS are similar shaped all peaking at around 50% on the horizontal scale and at the height of 0.015 on the vertical scale. The only difference is that DET distribution shows a slightly more pass rates towards the top end than the former SGT and IS and hence a slightly thicker tail at the end of the distribution.

The pass rates distribution patterns of the rest of the former education departments are not only different to the DET, SGT and IS group but also to one another. The growing gap between the former HOD and HOR is also notable in this distribution with the former HOR distribution showing two bumps one peaking at 70% and the other around 90%. This observation also explains the relatively larger standard deviation observed above for the former HOR.

Once again the distribution of average pass rates for the former HOA remained comparable to the previous periods in 2007 showing remarkable consistency over these periods.

The distribution of the pass rates by decile per former education department for 2007 is presented in Figure 8. As in 2004 the distribution pattern of the former DET, IS and SGT group of schools is almost similar, characterised by an even distribution of pass rates in the last five deciles each. However the pass rate distribution gap between the former DET and the SGT and IS can be seen with the former DET having only 25% of the

school pass rates in the first five deciles while the former SGT and IS are at 40.4% and 36.6%. The distribution showed a drop in the pass rates for the former SGT from only 18% in 2004 and a slight improvement for the former IS from 45% in 2004. The pass rates found in the last two deciles for the former DET, SGT and IS are 33%, 19% and 17% respectively with the DET and SGT showing a substantial decline and the IS showing a slight improvement from 2004. Only 10.5%, 9.2% and 8.6% of pass rates are found in the last decile for DET, SGT and IS respectively.

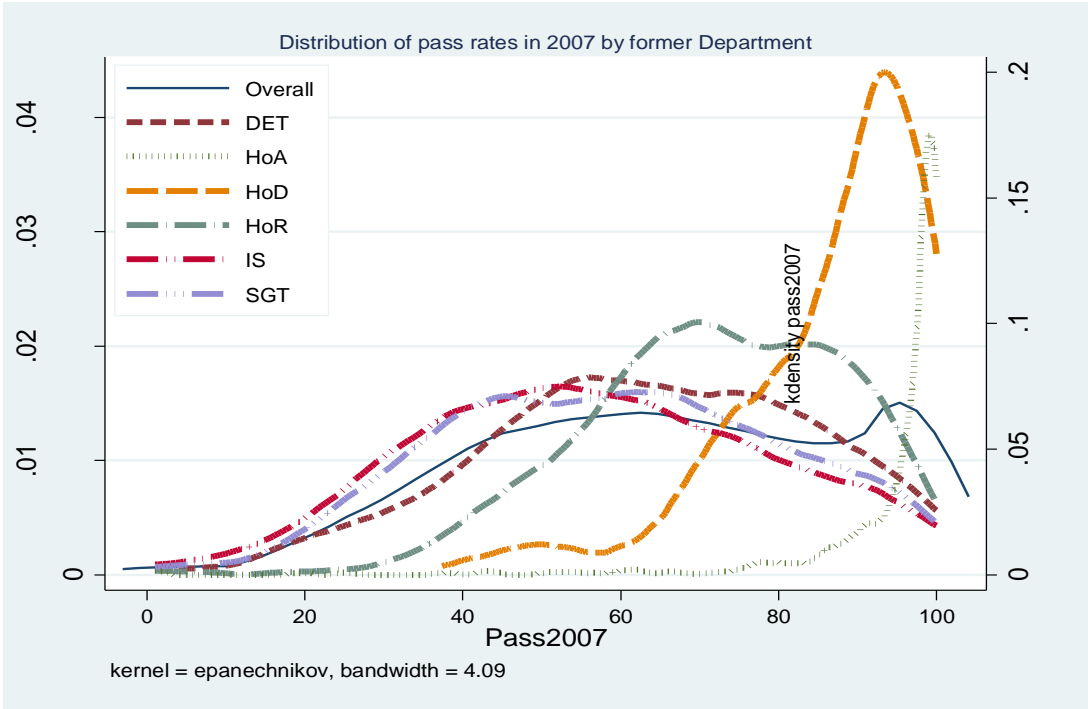


Figure 7: Kernel density distribution plots of school pass rates in year 2007 by former education department. By the author from the research dataset (2010)

The growing gap between the former HOD and HOR is also noticeable in the decile distributions of 2007. 9.7% and 2.2% of pass rates for the former HOR and HOD respectively are found in the first five deciles. However, both the former HOD and HOR performed much better than the former DET, SGT and substantially better than the former IS. About 83% and 57% of the school pass rates for in the former HOD and HOR are found in the last two deciles. This also substantially better than the former DET, IS and

SGT performance. Lastly, about 63% and 27% of the HOD and HOR respectively are found in the last decile.

Once again the former HOA pass rates continued the consistent trend in 2007. Only 1.6% of the school pass rates for the former HOA are found in the first five deciles or are 50% and below which is almost 15, 25 and 22 times better than the performance of the DET, IS and SGT respectively. About 93% of the school pass rates in this group are found in the last two deciles which is just over four times better than the average of the former DET, SGT and IS. Lastly, about 85% of the school pass rates are found in the last decile more which is more than 8 times better than the average of the DET, IS and SGT.

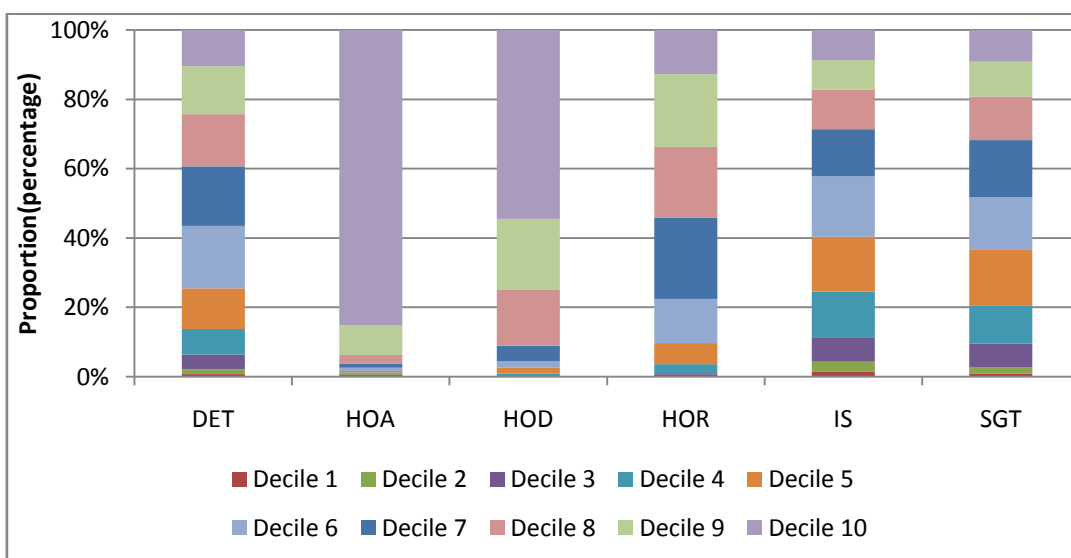


Figure 8: Distribution of pass rates in year 2007 by decile per former education department. By the author from the research dataset (2010)

4.2.5 School pass rates in 2009

Table 5 summarises the basic descriptive statistics for the year 2009 of the school pass rate for each of the former education departments. The overall pass rate is lower than that observed in 2007 at 58%. A closer examination of the pass rate averages per former education department reveals that all

had gone down from the 2007 averages albeit at different rates. However, the pass rate averages continued with the 2007 pattern.

The former SGT as in 2004 had the highest reduction at 9.8%, and then IS at 7.2%, DET at 5.2% HOR at 4.8% and lastly HOD at 4.3% with only the former HOA going up by 1.2%. The gap in average pass rates between the former HOR at 66.9% and HOD at 82.3% remained as wide as it was in 2007. As observed in 2007 the averages for the former HOR moved even closer to the DET below.

The change in the overall standard deviation and those of each of the former education departments suggests that on average the reduction in overall pass rates was distributed evenly across all schools within each former education department hence no notably high variation between 2007 and 2009.

TABLE 5: *Basic Descriptive Statistics 2009*

Former Department	Number of Schools	Mean	Standard Deviation
HOA	433	93.2%	10.6
HOD	112	82.3%	14.4
HOR	196	66.9%	16.4
DET	860	58.0%	20.5
IS	671	49.4%	23.4
SGT	1462	48.9%	22.1
Overall	3734	58.2%	25.1

Note: By the author from the research dataset (2010)

The Kernel density distribution plots in Figure 9 clearly show the continuation of an overall downward trend. A closer examination of the former education department plots shows five opposed to four different distribution shapes as was the case in 2007. The distribution of the former DET is substantially different to that of SGT and IS while the three

distributions were similar in 2007. While the distributions of the former SGT and IS peak at around 40% the distribution for the former DET peaks at around 65% showing a higher distribution of pass rates towards the top end and less at the bottom end as opposed to the distributions of the former SGT and IS, similar shaped all peaking at around 50% on the horizontal scale and at the height of 0.015 on the vertical scale. The only difference is that DET distribution shows a slightly more pass rates towards the top end than the former SGT and IS and hence a slightly thicker tail at the end of the distribution.

The distributions for the rest of the former education departments are not only different to the DET, SGT and IS group but also to one another. The growing differences in pass rate distributions between the former HOD and HOR also notable in this distribution. The former HOR distribution peaks at 70% while the former HOD at around 90%. For the first time in this analysis the distribution for the former HOA looked different in 2009. The distribution showed two peaks a lower density one (0.04) at about 90% and higher density one (0.9) at around 100%.

The decile distribution of the pass rates per former education department for 2007 is presented in Figure 10. The distribution for the former IS and SGT is strikingly similar in 2009 with about 52.5% of the pass rates found in the first five deciles for both former education departments while the former DET at only 36.6 %. Overall this showed a drop for all three former education departments from the 2007 pass rates where 40.4%, 36.6% and 25% of the school pass rates for the former IS, SGT and DET respectively were below 50%. The pass rates found in the last two deciles for the former DET, SGT and IS are 15.2%, 10.5% and 12.3% down from 33%, 19% and 17% in 2007 respectively. Only 7.1%, 5.1% and 3.8% of pass rates are found in the last decile for DET, SGT and IS respectively.

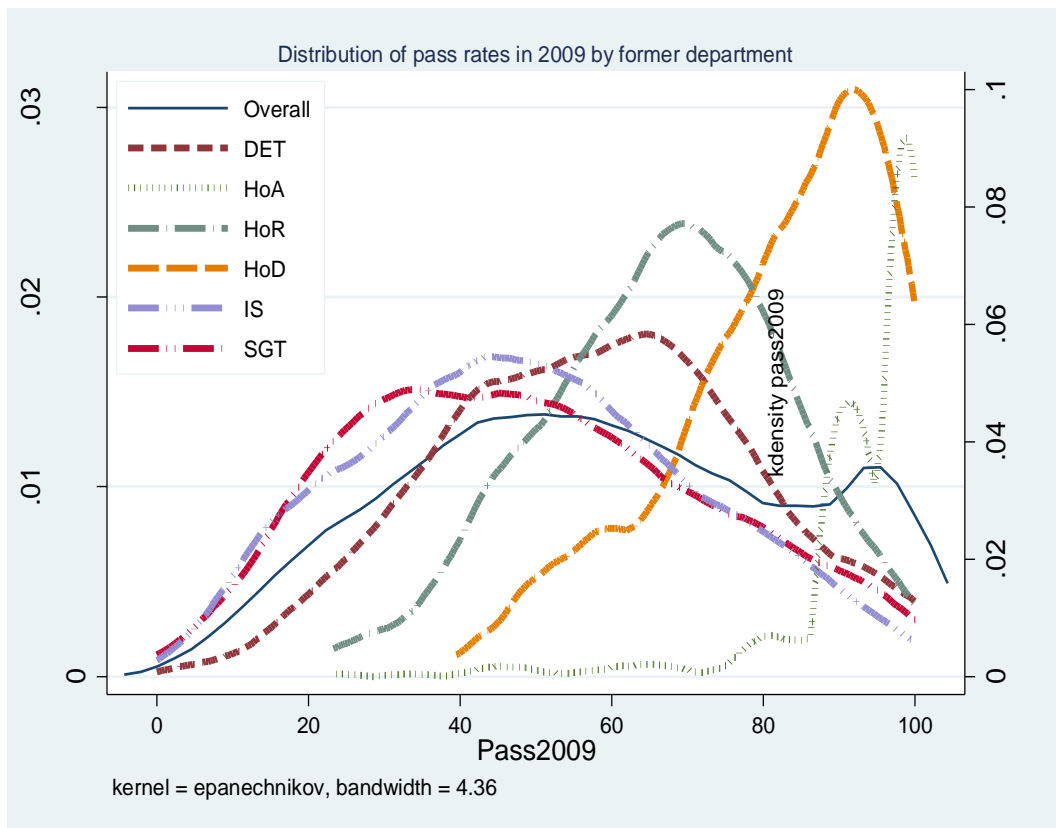


Figure 9: Kernel density distribution plots of school pass rates in year 2009 per former education department. By the author from the research dataset (2010)

The now glaringly big gap between the former HOD and HOR is also noticeable in the decile distributions of 2009. In 2009, 1.8% and 16.8% of pass rates for the former HOR and HOD respectively are found in the first five deciles. However, HOR performed much better than the former DET and substantially better than the SGT and IS. Also about 62% of the former HOD and only 20% of HOR school pass rates are found in the last two deciles and about 65% of the former HOD and 16% of HOR school pass rates are found in the last decile or are at 90% and above. In fact the pattern for the HOR in this regard is similar to that of the former DET.

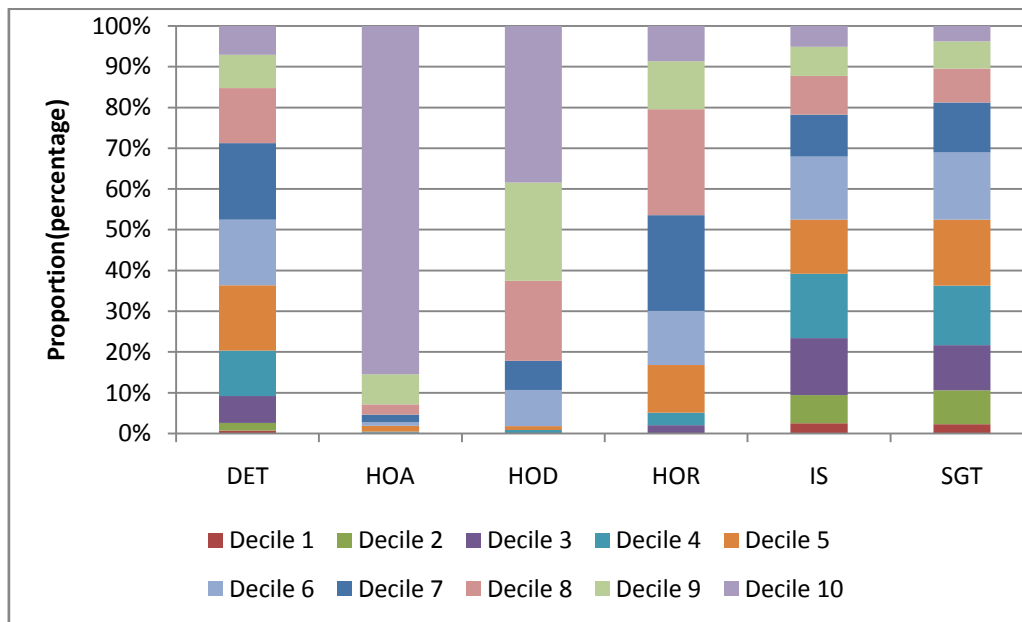


Figure 10: Distribution of pass rates in year 2009 by decile per former education department. By the author from the research dataset (2010)

Once again the former HOA pass rates continued the consistent trend in 2009. Only 1.8% of the school pass rates for the former HOA are found in the first five deciles or are 50% and below which is over 18, 25 and 25 times better than the performance of the DET, IS and SGT respectively. About 93% of the school pass rates in this group are found in the last two deciles which is just over eight times better than the average of the former DET, SGT and IS. Lastly, about 85% of the school pass rates are found in the last decile or are 90% and more which is more than 8 times better than the average of the DET, IS and SGT.

4.3 Composite presentation of the results using inferential statistics

4.3.1 Description of inequalities using the Gini Co-efficient measure

To analyse the performance differentials further within and between the former education departments in each of the years under study, the data is analysed using a Gini Coefficient technique. The Gini co-efficient was calculated using the Stata 10 statistical analysis package. The Gini Co-

efficient is widely used in economics mainly to measure socio-economic differentials or inequalities. But it is also used in other sectors such as health to measure health differentials and in education to measure achievement or performance differentials. Its calculation gives a value lying anywhere between zero (perfect equality) and one (perfect inequality (0-1)). The higher the value away from zero suggests the higher level of inequality.

The results of the Gini co-efficient calculation are presented in Table 6. What is notable is that the performance differential among former HOA schools is the lowest averaging about 0.04 with little variation over the years under study. On the opposite side the Gini coefficient among the former IS schools is the highest. The Gini co-efficient for the former DET and SGT schools are also high not only relative to the former HOA but also relative to the former HOD and HOR. The overall Gini over all the years under study is closer to the value of the low performing former education departments. The results suggest that performance differentials are more marked in low performing former education departments.

Also calculated is the percentage reduction in overall Gini co-efficient using year 2000 as a base year the value of which was used as an indication of reduction inequality or performance differentials over the years under study. Large reductions can be seen in 2002 and 2004 showing low reductions in 2007 and 2009 showing the reversing of the trend.

What is worth noting in the trends both within each former education department and overall is that the increase in average performance generally leads to reduction in inequality or performance differentials. This suggests that low performing schools tend to benefit more or are likely to account for much of the improved performance.

TABLE 6: Gini Co-efficient measures of matriculation pass rates in 2000, 2002, 2004, 2007 and 2009 per former education department.

Former Department	2000 Gini(APR)	2002 Gini (APR)	2004 Gini (APR)	2007 Gini(APR)	2009 Gini(APR)
HOA	0.04 (95%)	0.04 (96%)	0.03 (96%)	0.04 (94%)	0.05 (93%)
HOD	0.14 (73%)	0.17 (85%)	0.06 (90%)	0.08 (87%)	0.10 (82%)
HOR	0.14 (73%)	0.11 (79%)	0.11 (79%)	0.13 (72%)	0.14 (70%)
DET	0.26 (50%)	0.26 (65%)	0.17 (68%)	0.19 (63%)	0.20 (58%)
IS	0.27 (50%)	0.27 (54%)	0.26 (54%)	0.22 (57%)	0.27 (49%)
SGT	0.27 (47%)	0.19 (66%)	0.17 (70%)	0.21 (59%)	0.26 (49%)
Overall Gini	0.27	0.20	0.19	0.21	0.25
(%) Reduction in inequality from 2000 (Gini)		26.4%	31.9%	24.0%	8.9%
Overall Pass rate	55.9	68.2	70.6	65.0	58.2

Note: By the author from the research dataset (2010). APR=Average pass rate per former education department

While Gini Coefficient measure is useful to describe overall inequalities of all the groups combined and within each of the group, it is not able to decompose overall inequalities such that the contribution of within-group and between-group to the total inequality could be separated (World Bank, 2005, p.102). Identifying the main contributor to inequality is critical in order to ensure that policy measures are directed to those areas of need. The generalised entropy measures are therefore used for that purpose. The two generalised entropy measures are the Theil mean log deviation index depicted as $E(0)$ and the Theil Entropy index depicted as $E(1)$. Both measures are zero for perfect equality. For complete inequality, $E(0)$ goes to infinity while $E(1)$ reaches $n \ln(n)$. The two Theil inequality measures differ in their sensitivity to inequality in different parts of the distribution. The entropy measure, $E(1)$, is most sensitive to inequality in the top range of

the distribution, while the mean log deviation measure, $E(0)$, is most sensitive to inequality in the bottom range of the distribution (World Bank, 2000, p.99). For the purpose of this research the Theil entropy index will be used.

TABLE 7: *Theil Entropy index showing a decomposition of inequality resulting from within-group and between group measures of inequality*

Former Department	Inequalities within former departments, GE (1)				
	2000	2002	2004	2007	2009
DET	0.10604	0.05661	0.06701	0.08174	0.06701
HOA	0.01065	0.00842	0.0076	0.02526	0.0076
HOD	0.03073	0.01287	0.01634	0.0132	0.01634
HOR	0.03806	0.02009	0.03137	0.04381	0.03137
IS	0.11338	0.12123	0.11835	0.1193	0.11835
SGT	0.11964	0.06203	0.1087	0.10154	0.1087
Overall inequality due to <i>within-group</i> inequality, GE(1)	0.08527	0.05619	0.07323	0.05728	0.07323
Overall inequality due to <i>between-group</i> inequality GE,(1)	0.03474	0.01438	0.02797	0.01579	0.02797
Overall inequality, GE(1)	0.12	0.07057	0.1012	0.07057	0.1012
Percentage of overall inequality that is due to <i>within-group</i> in equality ^a	71.1%	79.6%	72.4%	81.2%	72.4%

Note: By the author from the research dataset (2010).
a Percentage of overall inequality that is due to within-group in equality calculated by this researcher.

Table 7 displays the general entropy indices or overall inequalities within former education departments, overall inequality, overall inequality due to within-group (within former education department) inequality; overall inequality due to between-group (between former education departments) inequality. In order to establish the extent of overall inequality that could be attributed to within former education department inequalities, a percentage of overall inequality that is due to within-group was calculated as a

percentage of overall inequality. The statistics indicate that the portion of overall inequality that could be attributed to within former education department inequalities is higher than the portion that is due to inequality between former education departments ranging from 71.1% to 81.2%. Examining the within former education department inequality indices, it is clear that the former IS and SGT are the largest contributors.

4.3.2 Using Regression Analysis techniques to compare performance differentials

Regression analysis is a general statistical procedure that yields estimates of the pattern and magnitude of relationship between a dependent variable and one or more independent variables (Dunn, 2004, p.170). Of particular importance to this study is the use of the feature of correlational analysis to interpret the relationship between the school pass rate (dependent variable) and the former education department of the school (independent variable). Some authors e.g. Borat and Oosthuizen (2006, p.9) have suggested that when dealing with skewed rather than normally distributed data, the quantile regression rather than the Ordinary Least Squares (OLS) regression should be used in order to ensure robustness of the analysis as the latter is sensitive to outliers. In this case, however, the OLS will be used although the data being analysed shows some degree of skewness consistent with the above analysis which focussed on measures of central tendency (the mean and standard deviation).

The software package Stata 10 was used to perform the analysis. Given that the predictor variable (former education department) is a categorical variable, performing regression without creating dummy variables for each of the six categories would yield incorrect results and thus the interpretation of the correlation between the dependent and independent variable.

In performing the regression, the former education department HOA was used as a reference point or for comparison and thus left out of the equation. The choice of the HOA as a reference point for comparison is critical not only a practical reason that the analysis so far has shown that pass rates for former HOA have been both high and consistent throughout the period, but also for the reason that historically the former HOA were the most resourced and highly effective. The expectation is therefore that any test of improvement in equality of educational opportunity should be in seeing the rest of the schools advancing towards the same performance levels as the former HOA schools.

Table 8 displays the outputs of Ordinary Least Squares regression fitted to pass rate (dependent variable) with former education department (dependent variable) for all the five years under study. This table is supported by Appendix B where full outputs for each year under study are displayed. The first measure that will be looked at is a coefficient of determination (R^2) which is a summary measure or index of the amount of variation in the dependent variable explained by the independent variable. The output indicates, overall, that the former education department explains the variation in pass rates in all the years under study by 35% in 2000, then 25% (2002), 27%(2004), 27%(2007) and 34%(2009) respectively. In all cases the relationship between the pass rate and the former education department was shown to be significant ($p=0.00$). The significance test was set at 95% confidence interval in all cases.

Lastly, the summary of output in the table displays the regression coefficients. The regression coefficient statistics in this output is equal to the constant (or the mean of the reference former education department) minus the means of the other predictors (or former education departments). The regression coefficient is therefore an indication of by how much more or less the mean of the reference former education department was in

reference to the means of the other former education departments. In all the years under study it is evident that the mean pass rates of the former HOA (reference former education department) were significantly higher than the pass rates of the former DET, HOD, HOR, SGT and IS as shown by the negative signs.

Therefore, in all the years under study, it can be said that the pass rates were, overall significantly different depending on the former education department and that in each of the years the pass rate for the former HOA was different to each of the other former education departments.

TABLE 8: *Result of the regression analysis of the effect former education department on pass rate*

Former Dept	Regression Coefficients				
	2000	2002	2004	2007	2009
HOD	-22.40008	-10.24995	-5.772111	-7.867418	-10.89504
HOR	-21.73631	-16.95952	-16.85974	-22.72749	-26.29478
DET	-45.16998	-30.64662	-28.15442	-31.25293	-35.17031
SGT	-48.01288	-29.50856	-26.24145	-35.76405	-44.27312
IS	-45.29198	-41.4699	-41.79035	-37.91201	-43.76303
HOA(Ref)	95.0358	95.46513	95.93372	94.44688	93.17182
R^2	0.3533	0.2445	0.2608	0.2639	0.3348
R	0.59	0.49	0.51	0.51	0.58
Significance at 95% CI	F(5,3728)=407.25 p=0.00	F(5,3728)=241.24 p=0.00	F(5,3728)=263.07 p=0.00	F(5,3728)=267.27 p=0.00	F(5,3728)=375.21 p=0.00

Note: By the author from the research dataset (2010)

4.3.3 Using the Repeated Measures Analysis of Variance (RM ANOVA) to test the equality of the means

Instead of using the standard Analysis of Variance (ANOVA), the multiple ANOVA will be used to test the equality of the means to analyse the data

further in order to explain the performance differentials between the former education departments. Repeated Measures Analysis of Variance (RM ANOVA) is used when all members of the sample are tested under a number of conditions (Experiment-Resources.com). Furthermore, the use of the standard ANOVA would not be appropriate for this study as the measurement of the independent variable (former education department) is repeated as that will violate the assumption of independence of data which is key requirement for a standard ANOVA test.

The data used in the study involves the measurement of school pass rates grouped per former education department (independent variable) measured at different times and thus is more appropriate for the use of the RM ANOVA. The null hypothesis being tested in this design is that there are no differences between the population means. Relating this to the main question of this research the null hypothesis being tested is that there are no performance differentials between the former education departments as measured in terms of the school pass rates repeated over a number of years. This design is referred to as a RM ANOVA with between-subjects factors (UCLA Academic Services). This is so as the sample members (the schools) are grouped into former education departments.

The key statistic in the RM ANOVA is the F-Ratios from which the conclusions are drawn about the population from which the sample was drawn (Experiment-Resources.com). Table 9 displays the output from NCSS 2007 of the repeated measures analysis. In the results the F-Ratios are significant at alpha equals to 0.05 or $p < 0.05$. The univariate approach to within-subject tests approach is followed as opposed to the multivariate approach and thus the assumption of sphericity has to be considered.

Although there are other two assumptions, namely, independence of observations and multivariate normality, the assumption of sphericity is

viewed as a necessary and sufficient condition for employing a univariate repeated measures of analysis (Huyn & Feldt, 1970, in Kogos, 2000, p.8). This assumption is met if all differences between the pairs of treatment condition scores (pass rates) are equally variable and if the variances of differences for all treatment condition are homogenous (Girden, 1992 in Kogos, 2000, p.8). The solution to the violation of this assumption is the correction factor known as epsilon which involves the downward adjustment of the degrees of freedom, depending on the severity of the violation, and this in turn leads to adjustment of the probability level.

TABLE 9: *Results of the Repeated Analysis of Variance*

Source Term	DF	Sum of Squares	Mean Square	F-Ratio	Probability Level	Power (Alpha=0.05)
A: year	4	177447.5	44361.86	104.67	0.000000*	
B: former dpt	5	3086086	617217.1	54.77	0.000000*	1.000000
AB	20	225386.1	11269.31	26.59	0.000000*	
S	18639	7899851	423.8345			
Total (Adjusted)	18668	1.18				
Total	18669					
* Term significant at alpha = 0.05						

Note: By the author from the research dataset (2010)

The output on Table 10 displays the three adjusted probability levels. The Geisser-Greenhouse and the Huyn-Feldt epsilon probability levels are mostly used with the former regarded as more the appropriate given its more conservative estimation of the epsilon (Kogos, 2000, p.9). The output shows no adjustment of the degrees freedom and minor adjustment of the probability level in the Geisser-Greenhouse epsilon suggesting that the violation of the sphericity assumption was at best minimal. The results still suggest significant within-subject differences at alpha=0.05, p=0.000045. After addressing sphericity assumption, the significance of the F-ratios and thus the results can then be interpreted with confidence.

The results of the analysis will be interpreted using Figures 11 and 12. Consistent with the main question of the research, the interpretation of the results will examine both the within-subject main effect or whether the mean pass rate changes over the years under study and the between-subject main effect or whether the former education department explain the mean pass rates. Firstly, Figure 11 shows that although there is no particular trend either up or down the mean pass rate is not constant across the years and this represents the within-subject effect. This observation has also been made elsewhere in this chapter using the descriptive statistics.

TABLE 10: *Probability Levels for F-Tests with Geisser-Greenhouse Adjustments*

Source Term	DF	F-Ratio	Regular Probability Level	Lower Bound Epsilon Probability Level	Geisser-Greenhouse Epsilon Probability Level	Huynh-Feldt Epsilon Probability Level
A: year	4	104.67	0.000000*	0.001778*	0.000045*	0.000000*
B: former dpt	5	54.77	0.000000*			
AB	20	26.59	0.000000*			
S	18639					

Note: By the author from the research dataset (2010)

Secondly, Figure 12 shows that the mean pass rates of former education departments are different over the period under study which is the between-subject main effect. It is evident that mean pass rates are highly dependent on the former education department. To illustrate this observation further, the output of the report of multiple comparison tests for all pair-wise differences between the means on Table 11 is referred to. It compares the mean pass rates across all the years under study and depicts for each former education department mean pass rate, which are the other departments that it is different from.

The mean pass rates of all the former education departments but the former SGT and HOD are different from four other former education departments. It is interesting to observe that although the former HOD and SGT departments share the same feature of being the only two that are different to only three other departments, the reasons for this are different. The reasons could be found from their relationship, in terms of pass rate distribution with the former IS and DET and the former HOR and HOA respectively.

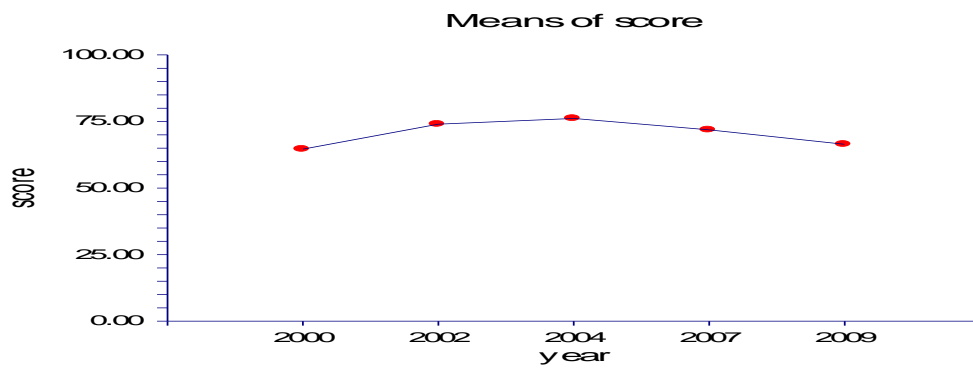


Figure 11: Overall mean pass rates per year

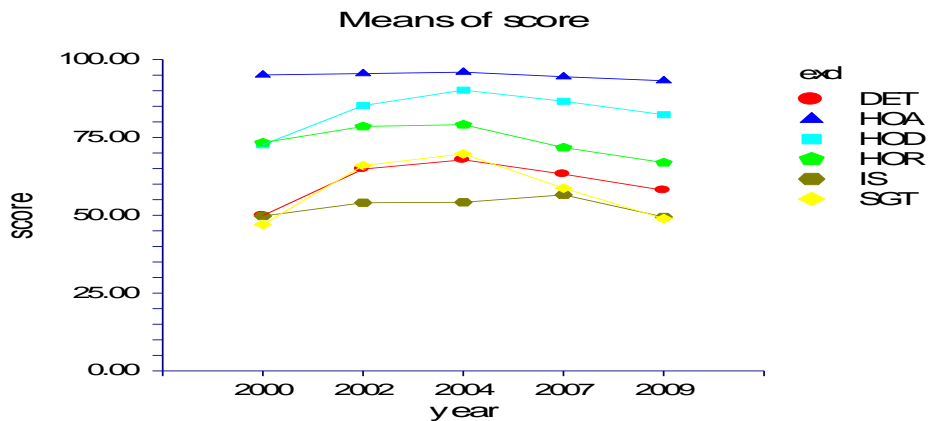


Figure 12: Mean pass rate per year by former education department.

The examination of the mean pass rates in Figure 12 shows that, on the one hand, while the mean pass rates of the former SGT, and DET departments started more or less at the same point in 2000 and were

similar during the 2002 and 2004 inclines, the mean pass rate of the former SGT department declined at a much higher rate than those of the former DET during the 2007 and 2009 decline. In fact the mean pass rates for the former SGT in 2007 and 2008 were similar to those of the former IS which were generally the lowest. On the other hand, while the mean pass rates for the former HOR and HOD started more or less at the same point in 2000, the mean pass rate for the former HOD increased at a higher rate than that of the former HOR as observed in 2002 and 2004 inclines, such that by 2004 it was more similar to that of the former HOA. Also the mean pass rate of the former HOR declined at a rate that of the former HOD.

TABLE 11: *Tukey-Kramer Multiple-Comparison Test- multiple comparison tests for all pairwise differences between the means.*

Group	Count	Mean	Different From Groups	Similar to Groups ^a
IS	3355	52.76522	DET, HOR, HOD, HOA	SGT
SGT	7310	58.05066	HOR, HOD, HOA	IS, DET
DET	4299	60.73182	IS, HOR, HOD, HOA	SGT
HOR	980	73.8951	IS, SGT, DET, HOA	HOD
HOD	560	83.37375	IS, SGT, DET	HOR,HOA
HOA	2165	94.81067	IS, SGT, DET, HOR	HOD
Response: score (pass rate), Term B: exd (former department)				
Alpha=0.050, Error Term=AB, DF=20, MSE=11269.31,Critical Value=4.4453				

Note: By the author from the research dataset (2010)

a The column "Similar to Groups" is not part of the original output it was added by the author from another output table

CHAPTER FIVE

ANALYSIS AND INTERPRETATION OF THE FINDINGS

5.1 Introduction

As an introduction to this chapter, the link between the research questions and the supporting conceptual framework and the literature review will be re-established in order to allow for a logical flow towards the interpretation of findings in this chapter.

The main research question attempts to examine the extent of the performance differentials among schools in terms of senior certificate pass rates categorised according to the pre-1994 departments or former education departments and most importantly asks whether or not such performance differentials have changed significantly in the period under study.

To explore the main question further, the following secondary questions will be addressed:

- What are the performance differentials between the different former education departments?
- What are the performance differentials between schools within the former departments?

As discussed in Chapter One, the study is anchored within a conceptual framework which links the concepts of equity and redress, as central tenets of post apartheid education policy, to concepts equality of educational opportunity. The study further conceptualises equality of educational outcomes, which is the absence of performance differentials, as a logical expectation flowing from the equality of educational opportunity thus the examination of the schools pass rates.

The literature review in Chapter Two further explored the concepts equity, redress and equality in the context of this study. The conclusion from the literature review regarding the expectation of perfect correlation between the educational opportunity and equality of outcomes was inconclusive. This is so as some authors argue that some factors outside the realm of what is possible in ensuring equality educational through policy instruments e.g. socio-economic background of the learners, may affect the quest for equality of outcomes. It is in this context therefore that inequalities within the former education departments become as important as between them.

In essence, therefore, the interpretation of the findings that follows will be within the framework of these conceptual frames.

5.2 Analysis and Interpretation of the findings

The analysis will follow the two main themes in line with the research questions.

5.2.1 The performance differentials between the former education departments

5.2.1.1 The strength of the matriculation examination as an indicator of educational system performance

Before embarking on the interpretation of the results, it is perhaps important that one addresses the issue of the validity of the matriculation results as a measure of educational performance. As discussed in the literature review concerns that due to pressure upon the system to perform examination standards were lowered reached high levels in 2003 (Crouch and Vinjevold (2006, p.13). Research conducted by uMalusi in 2004 eventually found that there was, indeed, a decline in cognitive demands in some papers. Examiners were then requested to increase cognitive demands of examination papers from 2004 onwards, hence slight declines

in performance in the latter of the study.

In this research findings that support the above were also observed. Over the years under study, relatively high levels of inconsistency or fluctuation in pass rate distributions involving the former HOD, DET, HOR and SGT departments were observed. The mean pass rates of these former education departments started at a particular point in 2000 reached a peak in 2004 and had returned to a lower point almost equal to a point were at in 2000 by 2009.

Although this is important to bear in mind when interpreting the findings of this research, it is also important to note that all learners were exposed to the same examination papers and thus, overall, the effects of the changes should have been equally distributed among all learners. The researcher therefore believes that these changes did not have any effect on the findings of this research.

5.2.1.2 Overall performance differentials between former departments

The study used the techniques of regression analysis or the Ordinary Least of Squares (OLS) to determine the significance of the performance differentials between the former education departments groups of schools. In each of the years under review, looking at the co-efficient of determination, it was found that the differences in the pass rates of schools could be explained by the former education department in which the school belonged. Overall, the magnitude of the difference that could be explained by former education department ranged from 27% to 35% over the period under study. In addition, the significance test of the comparison of the mean pass rate of the former HOA department group of schools as a reference group to that of all the other former education departments groups combined found that the means were significantly different at 95% confidence interval.

While OLS technique helped to explain the differences in pass rates in each of the years under study individually, the Repeated Measures ANOVA (RM ANOVA) technique helped to explain whether or not the means of the former education departments were different over the period under study, through comparing the variances in pass rates between the departments to the variance within the departments.

The descriptive statistics also showed some telling patterns around the performance differentials between former departments. The general pass rate distribution patterns in the first two years of study (2000 and 2002) showed the six former education departments forming three distinct groupings. These sub-groups were the former HOA on its own, the former HOR and HOD sharing a similar distribution pattern and the former DET, SGT and IS making up the third group, ranked from the highest to the lowest performing group respectively. Though in subsequent years this pattern of distribution showed signs of disintegration such that in 2004 only the former DET and SGT schools shared the same distribution of pass rates pattern, overall, the pattern could be seen throughout the years under study.

The overall observation of these performance differentials exhibit the patterns that obtained under apartheid education. Furthermore they also model the levels of disadvantage of schools during the apartheid era where the former HOD schools were the most advantaged and schools in the homelands the most disadvantaged in terms of resource allocation. The performance gap between the former HOA and the rest of the former education departments confirms what Soudien (2007) observed. He observed that the lack of quality in education and the resultant differentiated attainment between the rich and white and the poor and black could be attributed to the legacy of apartheid which was still a key determinant of learner and school attainment.

As argued in the literature review the aim of education reforms introduced by the new government were premised upon the concepts of equity and redress in the education resourcing and had the ultimate aim of impacting on the education outcomes patterns that existed under apartheid. Furthermore this resourcing-based equity and redress approach could be said to be based on the assumption that resources mattered as a determinant of learner achievement.

It is important, however, to note that conclusions in the literature review section regarding the determinants of learner achievement were rather mixed. Some authors argued that factors outside schools such as socio-economic status are more important determinants of learner achievement than in-school factors such as resourcing and school management. Taylor (2006, p.10), as discussed in the literature review, cited a number of studies in South Africa which concluded that factors outside school such as race, parental education and income and language are key determinants of educational performance in South Africa and thus impact on educational opportunity. The main studies in South Africa involved the analysis of matriculation data (Van der Berg & Burger 2003; Oosthuizen & Borhat, 2006); the SACMEQ data (van de Berg & Louw, 2007).

However, the argument for the importance of resources cannot be dismissed entirely in this debate. It is widely acknowledged that even if the richer schools receive less funding from the state, they are able to mobilise more substantial private funding to augment government funding to the extent that they are able to maintain the resource advantage over the less richer schools who largely rely on state funding. Motala (2008) found that parental financial contributions continued to be the determinant of differential in the public schooling sector. She further found that these private contributions were used for quality-related inputs such as reducing learner: educator ratios and employing additional educators.

5.2.1.3 Some specific observations of performance differentials between former departments

Specific performance trends regarding certain former departments which were expected to exhibit similar patterns of performance consistent with pre-1994 trends were observed. Interesting observations were made in relation to the relationships between, on the one hand, the former HOD and HOR, and on the other, the former DET and SGT. While performance distributions of the former HOD and HOR departments started at the same point in 2000, the performance distribution former HOD increased at a higher rate than that of the former HOR and thus reaching a higher peak in 2004. Also notable is that even during the decline up to 2009, the performance distribution of the former HOD declined at a lower rate than that of the former HOR. While the pass rate distribution patterns between former DET and SGT had been similar in the previous years under study, they looked significantly different in 2009.

Perhaps the explanation of these trends could also lie in the literature on determinants of learner achievement. One particular study that could assist in regard is the analysis of SACMEQ 2000 data conducted by van der Berg and Louw (2006). As one of the areas of analysis the study was concerned with modelling the relationship between socio-economic status and schooling in South Africa focusing on mathematics scores. What was different about this analysis was that it examined the performance of the South African learners in regional context (Southern Africa) to understand as to why South African primary school learners performed worse than their socio-economically and less resource endowed counterparts in the region.

The study found that neither the resource endowment of the schools nor the socio-economic background of the learners could explain the poor performance for the 60% of the poorest schools or the schools that were disadvantaged under apartheid. It was, however, found that for the

remainder of the 40% richer schools the socio-economic background of the learner did matter. Further investigation to establish reasons why rich schools were better at converting socio-economic advantage into learner performance found that school level factors other than resources interacted with socio-economic advantage to enhance student performance. These were factor that may proxy for school management and functioning which included teacher absenteeism, principal monitoring of learner progress and teacher quality.

Comparatively, former HOD schools due to their historical background fare much better than the former HOR schools in terms of school management and functionality. Similarly as compared to former SGT schools former DET schools exhibit better functionality. It is therefore possible that due to their better functionality levels the former HOD and DET schools have fared better than would be expected. This shows that schools functionality could be one of the critical aspects in the quest to improve school effectiveness and thus learner performance.

This finding is critical in that it begins to point to the fact that dysfunctional schools, which are a common feature in poor communities, may be reason why these schools are unable to take advantage of their resource endowment albeit inadequate to mitigate the effects of social disadvantage on learner performance.

5.2.2 The performance differentials within the former education departments

As much as the study found that there were statistically significant performance differentials between the former education departments, it also found that there were significant performance differentials within each of the former education departments. The Gini co-efficient measure which

is a measure of inequalities mainly used in the field of economics was used to quantify overall performance differentials further. The main focus, however, was on performance differentials within the former education departments and their relationship with overall performance differentials.

Using a simple Gini coefficient measure it was found that there were significant performance differentials within some former education departments. The performance differentials within the former DET, SGT and IS departments were higher than those of the former HOA, HOD and HOR with the former HOA department showing the least performance differentials. In essence, the performance differentials between schools were larger in former education departments which, overall, were low performing.

In order to establish the proportion of overall performance differential that could be attributed to within former education department performance differential, the Theil Entropy Index measure of inequality was used. The main advantage of the Theil Entropy Index, as opposed to the simple Gini coefficient which can only infer magnitude of the overall differentials between individual schools, is that it infers the magnitude of the overall differentials between the groups. Furthermore, it apportions the differentials, from the overall, which due to within group and between groups.

Overall, it was found that, in all the years under study, of the overall performance differentials, the proportion of performance differential that were due to within the former education department ranged from 70%-81%. Logically, the major contributors to this statistic are the former education departments identified as having the high performance differentials between schools. This finding is critical in terms of policy considerations in that, it suggests that the unit of analysis should rather be an individual

school than a groupings.

The discussion on quality and educational adequacy as conceived by Fiske and Ladd (2005, p.5) discussed under in the literature review section in this report bears relevance to the interpretation of the results performance differentials between schools. The argument was made in the literature review that while the focus of measurement in equal educational opportunity is the achievement between groups, in educational adequacy the concern is with whether each learner can achieve results in terms of standards set at national level. This calls for the attention to be diverted to both the learner and the school. The key question to answer in this regard is why some schools, assuming a homogenous group, are successful at assisting learners to achieve results than others. In essence this finding renders the large boundaries around what is often assumed as homogenous groupings irrelevant.

Khosa (2010, p.2) identifies what he calls two parallel initiatives that have been driving efforts to improve the schooling system in South Africa since 1994. A government led reform agenda and a school improvement agenda led by non-state agencies funded by private sector and civil society. Some of the school improvement initiatives were discussed in the literature review section of this report. Motala (2001, p.32) argues that relevance of whole school improvement is that it “challenges the assumption that policy change at macro level leads to school level change”, which in essence the assumption of the reform agenda.

In essence the reform agenda largely ignored what was happening at school level. This view is supported by Crouch and Patel (2006, p.9) when they argue that “South Africa has a cavalier attitude when it comes to enforcement of quality...partly because of the decentralised nature of the system...and also partly as a matter of historical attitude”.

Schools as institutions develop and maintain particular cultures and ethos. This quote from the Ministerial Committee that investigated schools that manage to achieve good results despite the odds succinctly captures this “Their organisational cultures supported hard work, achievement and success. And their internal accountability structures enabled them to meet the demands of external accountability, evidenced most particularly in Senior Certificate results” (DBE, 2007, p.81). Left without direct change management initiative such as school improvement initiatives, schools have largely maintained their pre-1994 organisational cultures some of which do not support the intentions of striving for high levels of achievement. It is therefore not surprising that former HOA schools have maintained their culture of quality outcomes while the DET, SGT and IS school have struggled with the demands for quality outcomes.

It is critical to note also that the finding regarding the variation in performance particularly in low performing former education departments suggest that these schools are at different positions in the quality continuum. This further emphasizes that a “one size fits all” approach would not be effective in trying to raise the quality levels of these schools; rather a school by school approach is required. This is a mammoth task given that many researchers estimate that about 80% of the schools in the system are not producing the quality that is expected.

The interventionist approach that both the government and the non-state sectors often adopt would be effective if the situation was the other the reverse, that is, 80% of schools producing the quality and the focus thus being on the 20%. As such Motala (2001, p.72) states that the challenge remains whether the experiences from the small scale school improvement interventions could be “extrapolated and co-ordinated with policy interventions on a larger scale”.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

One of the critical education policy objectives of the post-apartheid government was to ensure equality in the provisioning of education in order to address the inequalities of the past and thus the realisation of equal educational opportunity. The concept of equal educational opportunity is not only critical as a social justice imperative but also critical for economic development of the country. Previous studies that have examined educational outcomes have indeed found that inequality in educational outcomes continued in the post-apartheid schooling system. However, these studies have not only been few they have also been cross-sectional in nature. There is therefore a need for studies that are longitudinal in nature in order to determine trends over time.

The purpose of this research was to contribute to the further understanding of the effectiveness of post-1994 educational policy reforms in addressing educational inequalities of the past. The main research question of the study attempted to examine the extent of the performance differentials among schools in terms of senior certificate pass rates categorised according to the pre-1994 or former education departments and most importantly asks whether or not such performance differentials have changed significantly in the period under study.

To explore the main question further, the following secondary questions will be addressed:

- What are the performance differentials between the different former education departments?
- What are the performance differentials between schools within the former departments?

The research was anchored within a conceptual framework that links the concepts of equity and redress, as central tenets of post-apartheid education policy, to concepts equality of educational opportunity. The study further conceptualise equality of educational outcomes, which is the absence of performance differentials, as a logical expectation flowing from the equality of educational opportunity thus the examination of the schools pass rates. The literature review further explored the concepts equity, redress and equality in the context of this study and also examined empirical research conducted both in South Africa and internationally.

The research employed the quantitative methodology to present the information. The basic unit of analysis was the school. The critical factor about the data is that it only included public schools that had a complete history of having registered candidates for matriculation examination for all the years included in the study. The main limitation in relation to the data that has been acknowledged is that the study could have been richer had more variables for comparison such socio-economic status of the school could have been available.

6.2 Conclusions

There are two main conclusions that could be drawn from the study.

6.2.1 Historical background of schools explains overall performance differentials

Firstly, the study has succeeded in answering the main question of the study which was to establish whether or not the differentials as observed in matriculation school pass rate could be explained by their historical background the schools. This was found to be true throughout the period under study. This suggests that policies introduced to bring about equity and redress has been unable to address the legacy of the inequalities that

were the feature of the differentiated education system of the past.

As discussed in the literature the main policy lever that has been used to try and address the inequalities of the past in education is the differentiated resourcing, in particular financing of the resources critical for learning and teaching using a socio-economic criteria or the poverty ranking of a school. This meant that schools were allocated resources such as learning and teaching material and teachers based on their socio-economic circumstances. The question is therefore whether or not this focus was adequate to achieve equity and redress in education and whether or not as a result of that focus policy makers did not underplay the importance of other input resources such as learning and teaching facilities (libraries, laboratories, class room space) and the quality of teachers.

Perhaps the most important lessons in the interpretation of the findings in relation to the macro policy intervention was that conventional approaches of analysis regarding the determinants of learner achievement need to be applied in context. The finding that determinants of the performance of the poorest 60% section of the schooling system did not fall into the conventional divide of outside and inside school determinants of learner performance suggests that more nuanced policy research is required to understand this phenomenon.

6.2.2 The findings on the performance differentials within the former education

The findings from the data analysis revealed that the performance differentials were more marked between schools within the former education department groupings than between the groupings. What was more striking was that the differentials were more acute in the low performing former education department groupings suggesting that the level of homogeneity was much weaker in terms of performance in the

groupings.

The critical lesson from the policy research and intervention perspectives is that as opposed to be taken as an end of an analysis large groupings of schools e.g. by poverty rank, they should be taken as means towards a more nuanced analysis.

The interpretation of the findings suggested that there is a need for policy shift towards recognising that schools as institutions and organisations develop particular cultures and ethos and should therefore be treated as such. This calls for policy makers, in their quest to assist all schools to achieve particular quality standards, to focus on a school as a unit of analysis rather than groups of schools. This is critical in that schools as unique entities respond in different ways to demands from the outside environment, thus, a “one size fits all” approach is unlikely to yield positive and lasting results. Once more macro-level policy intervention should not be seen as end in itself but a means to end which is school level intervention.

Overall, in conclusion, the study found that not only was there statistically significant performance differentials between schools based on the former education departments, these differences were significant throughout the period under study. The study also found that there were significant performance differentials within the former education departments and these were more significant in low performing former education departments.

6.3 Recommendations

6.3.1 Recommendation on methodological approach to policy research and formulation

Analysis of performance data conducted in this research provides broad pointers as to the direction of policy research into the distribution educational opportunity in the system. It points to the importance of beginning with outcomes as a point of departure in evaluating the performance of the education system. The study has shown that the inputs based approach to addressing the equality and quality imperatives have so far not yielded satisfactory results.

A conscious methodological approach which involves working backwards from the analysis of the education outcomes and outputs (quality), process of conversion of inputs into outputs (which is in essence the analysis what is happening at school level) before deciding on input requirements is therefore recommended. In this way the policy development process will firmly establish the school as a point of departure. In other words the micro level situation will inform the macro level intervention. This then means that quality indicators would have to be monitored from school level.

6.3.2 The centrality of the school as an agent of quality education in disadvantaged communities.

A more specific recommendation on the above further emphasises the centrality of a school as an agent that must be used to mitigate the negative impact of disadvantaged socio-economic background on educational attainment. Majority of the 80% of the schools that are said to be unable to produce the required quality are situated and attended by learners from disadvantaged backgrounds. This is likely to remain the case in the foreseeable future. Interventions such as the school nutrition programme, no fee school only address part of the challenge that is related

to access. Other critical quality aspects such as parental involvement at home and in the running of the school and holding teachers accountable which are very much part of the system in the advantaged communities are not addressed.

It is therefore recommended that policy direction should be channelled towards a situation where direct parental involvement in the education of the learner is systematically rendered less relevant in disadvantaged communities. For instance more district support and monitoring resources could be directed towards poor schools and communities. One of the practical measures could be to waive the requirement that for one to be a member of the school governing body they must have a learner in that particular school.

6.3.3 Recommendation for further research

The following areas of future research on the subject are recommended:

- A more deeper research into the performance differentials using more variables such as racial composition of the school, school level resources and socio-economic background of the learners in addition to the data on former education department.
- A more detailed research focussing on performance differentials in one of the low performing former departments and examining the impact of the province and the district in which a school is situated on the school's performance.

REFERENCES

Abdi, A.A. (2003). Apartheid and education in South Africa: Select historical analysis. *The Western Journal of Black Studies*, 27, 2, 89-97. Retrieved on September 11, 2009 from EBSCO

Atieno, O. (2009). An Analysis of the Strengths and Limitations of Qualitative and Quantitative Research Paradigms: Problems of Education in the 21st century. Vol. 13, p13-18. Retrieved on September 13, 2009 from EBSCO Host database.

AzimPremji Foundation. (2004). *Status of Learning Achievement in India: A Review of Empirical Research*. Retrieved on 5 January 2007 from <http://www.azimpremijifoundation.org/downloads/StatusofLearningAchievementsinIndia-Chart2&3.pdf>.

Bhorat, H. and Oosthuizen, M. (2006). *Determinants of Grade 12 Pass Rates in the post-Apartheid South Africa Schooling System*. Development Policy Research Unit University of Cape Town

Chisolm, J. (2004). Matric Results 2003: Public Debate lack Quality Information and Analysis. *HSRC Review*, Vol. 2 No.1. Retrieved on March 8, 2010 from www.hsrb.ac.za.

Crouch, L and Vinjevold P. (2006). South Africa: Access before quality, and what to do now? *Profesorado. Revista de Curriculum y Formación Del Profesorado*.10,(1),1-16. Retrieved on April 30, 2008, from (<http://www.ugr.es/~recfpro/rev101ART6ing.pdf>)

Crouch, L. (2005). South Africa equity and quality reforms: possible lessons. *Journal of Education for International Development*, 1, (1). Retrieved February 5, 2007 from (<http://www.equip123.net/JEID/articles/1/1-2.pdf>)

Crouch, L. and Patel, F. (2006). Investment Choices for Education in South Africa. Paper for DBSA/HSRC/Wits NEPAD Conference, Johannesburg, 19-12 September 2006.

Department of Education (1996). National Education Policy Act of 1996

Department of Education. (1998). National Norms and Standards for Funding of Public Schools, Notice 1293 of 1998.

Evettes, J. (1970). Equality of Educational Opportunity: The Recent History of a Concept. *The British Journal of Sociology*, 21, (4). Retrieved May 10, 2008 from JSTOR

Fedderke, J.W. & Luiz, J.M. (2000). Production of educational output: time series evidence from socio-economically heterogeneous populations: The case of South Africa 1910-1993. ERSA: University of the Witwatersrand. Retrieved on September 11, 2009 from

(<http://www.econrsa.org/archives/wpapers/wpapaers/wp07.pdf>.)

Fiske, E. and Ladd, H. (2004). Racial Equity in Education: How Far Has South Africa Come? *Working Papers Series SAN 05-03*. Terry Sanford Institute of Public Policy: Duke. Retrieved 12 August, 2007 from (<http://www.sanford.duke.edu/research/papers /SAN05-03.pdf>)

Fiske, E and Ladd, (2004) *Elusive Equity: Education Reform in Post-Apartheid South Africa*. HSRC Press: Cape Town.

Fraenkel, N.Y., Wallen, E (2000). *How to design and evaluate research in education*. Longman: New York

Gilmour, J.D. (2001). Intention or tension? Recent education reforms in South Africa. *International Journal of Educational Development*, 21, 5-19. Retrieved on September 11, 2009 from EBSCO

Haegeland, T., Oddbjorn, R. and Salvanes, K.G. (2004). Pupil achievement, school resources and family background. *Discussion Papers No. 397*. Statistics Norway, Research Department.

Harrison, M. (2004). The history of education under apartheid. [Review of the book *The history of education under apartheid 1948-1994: the doors of learning and culture shall be opened*]. *International Journal of Educational Development*, 24, 451-461. Retrieved on September 11, 2009 from EBSCO

Ismail, M. (2005). *Quantitative Research Methodology*. Paper presented at Pusat Pengajian Ilmu Pendidikan Kolokium Pelajar Pengajian Siswazah PPIP 2005. Retrieved September 11, 2009, from ([http://www.radiodpb.org/RelatedNotes/Mokhtar Ismail/Qualitative/research/methodology.pdf](http://www.radiodpb.org/RelatedNotes/Mokhtar%20Ismail/Qualitative/research/methodology.pdf))

Kanjee, A. (2004). Making sense of matric pass rate *HSRC Review*, Vol. 2 No.4. Retrieved on March 8, 2010 from www.hsrb.ac.za.

Kingdon G.G. (1999). How Much Do Schools Matter to Pupil Achievement in India?

Institute of Economics and Statistics: Oxford University. Retrieved on January 5, 2007 from (<http://www.economics.ox.ac.uk/Members/geeta.kingdon/PublishedPapers/JEPA-Schoolspupilachievement.pdf>)

Kogos, Stephen C. Jnr (2000). *Repeated Measures Designs and Sphericity Assumption*. Retrieved on December 15, 2009 from ERIC

Lubisi, R.C. and Murphy, R. (2002). Assessment in South African Schools. *Assessment in Education*, 9(2), 255-266. Retrieved on March 8, 2009 from EBSCO

McBurny, D.H. & White, T.L. (2007). *Research Methods*. Carlifornia: Thomson Learning

Monk, D.H. (1989). The education production function: It's evolving role in policy analysis. *Educational Evaluation and Policy Analysis*, 11, 1, 31-45. Retrieved September, 19 2009, from (<http://www.jstor.org/stable/1163714>)

Motala S. (2006). *Education and transformation in South Africa: The impact of finance equity reforms in public schooling after 1998*. Johannesburg: University of the Witwatersrand.

Ndaba, S. (2005). Halos and horns: reliving constructions of matric performance in the South African education system. Paper presented at the CHET & UMALUSI Seminar on *Matric: what is to be done?* held in Pretoria, June 23. Retrieved on March 8, 2010 from <http://www.umalusi.org.za/ur/research/ndaba.pdf>

OECD (2008), *Reviews of National Policies for Education: South Africa*, OECD, Paris

Pole, K. (2007). Mixed methods designs: A review of strategies for blending qualitative blending quantitative and qualitative methodologies. *Mid-Western Educational Researcher*, 20, 4, Retrieved on September 11, 2009 from ERIC

Rakometsi, MS. (2008). *The Transformation of Black School Education in South Africa, 1950-1994: A Historical Perspective*. Unpublished Thesis, University of the Free State

Republic of South Africa, 1996. *South African Schools Act of 1996*. Pretoria

Republic of South Africa. 1996. *The Constitution of the Republic of South Africa*. Government Gazette No. 108 of 1996. Pretoria

Reschovsky, A. (2004). Financing Schools in the New South Africa. *Journal of Comparative Education Review*, 50, (1): 21-43

Roscigno, V.J, Tomaskovic-Devey, T & Crowley, M. (2006). Education and Inequalities of Place. *Social Forces*. 84, (4). 2121-2145. Retrieved May 10, 2008 from ProQuest

Schenker, J.D., & Rumrill, P.D. (2004). Causal-comparative research designs. *Journal of Vocational Rehabilitation*, 21, 117-121. Retrieved on September 11, 2009 from EBSCO

Secada, W.G. (1989). Educational equity versus equality of education: An alternative conception. In Secada, W.G (Ed.), *Equity and Education*, pp.68. New York: Falmer

Soudien, C. (2006). Enhancing Our Freedoms” Education and citizenship in South Africa. Retrieved 5, May 2008 from (http://www.wolpetrust.org.za/Dialogue2006/EC102006soudien_paper.pdf)

Soudien, C. (2007). The “A” Factor: Coming to terms with the question of Legacy in South African education. *International Journal of Educational Development*, 27, 182-193. Retrieved May 18, 2008 from Science Direct Database

Taylor, N (2006), 'Equity, efficiency and the development of South African schools', unpublished paper.

UNESCO (2004). *Education for All Global Monitoring Report 2005: The Quality Imperative*. Paris: UNESCO Publishing

Van der Berg, S. (2005). *Apartheid's Enduring Legacy: Inequalities in Education*. Paper to Oxford University/University of Stellenbosch Conference on *The South African Economic Policy Under Democracy A 10-Year Review*, Stellenbosch, 27-28 October 2005.

Van der Berg, S. and Burger, R. (2003). *Education and Socio-economic Differential: A Study of School Performance in the Western Cape*. Working Paper, 3/73. Retrieved May 10, 2008 from (<http://www.commerce.uct.ac.za/DPRU>)

Van der Berg, S; Burger, R and Yu, D (2005) *Determinants of Education Quality: A report on the Western Cape Primary School Pupil survey 2003*. Paper presented at the Second Meeting of the Consortium for Research on School Quality, April 2006. Available at <http://www.jet.org.za>

Van der Berg, S. and Louw, M. (2007). *Lessons learnt from SACMEQII: South African Student Performance in Regional Context*, Stellenbosch Economic Working Papers, 16/2007, Stellenbosch University. Available at www.sacmeq.org

Van der Berg, S., 2008. "How effective are poor schools? Poverty and educational outcomes in South Africa." Paper delivered at Cege research colloquium, University of Göttingen, November 2007. Available at (www.uni-goettingen.de/de/)

Weber, E. (2002). An Ambiguous, contested terrain: governance models for a new South African education system. *International Journal of Educational Development*, 22, 617-635. Retrieved on September 11, 2009 from ESBCO

Wenglinsky, H. (1997) *When Money Matters*. Princeton, NJ: Educational Testing Service

Wildeman, R. (2000). Equity in education: How far are we? *Budget Brief No. 44*. IDASA Budget Information. Retrieved 5 February 2007, from (<http://www.idasa.org.za/bis/>)

Wildeman, R. (2001). School funding norms: Are more poor learners benefiting? *Budget Brief No. 79*. IDASA Budget Information. Retrieved February 5, 2007 from (<http://www.idasa.org.za/bis/>)

World Bank, 2000. *Making Transition Work for Everyone: Poverty and Inequality in Europe and Central Asia*. Washington DC

APPENDICES

APPENDIX A

CONSTRUCTED DATA PROCESS

Public schools used in the study as a percentage of all public schools that existed in 2000 and in 2009.

Province	Total Number of Schools (Constructed data)	Total Public Schools that offered Matric in 2000	% age of Constructed to 2000 total	Total Public Schools that offered Matric in 2009	% age Constructed to 2009
EASTERN CAPE	582	817	71%	856	68%
FREE STATE	256	301	85%	302	85%
GAUTENG	460	492	93%	590	78%
KWAZULU-NATAL	925	1229	75%	1484	62%
LIMPOPO	868	1258	69%	1258	69%
MPUMALANGA	186	335	56%	601	31%
NORTH WEST	206	358	58%	321	64%
NORTHERN CAPE	4	97	4%	115	3%
WESTERN CAPE	247	326	76%	357	69%
Overall	3734	5213	72%	5884	63%

Table: Pass rate per province according to the constructed data.

Province	2000	2002	2004	2007	2009
EASTERN CAPE	49%	50%	52%	57%	49%
FREE STATE	56%	73%	80%	74%	71%
GAUTENG	66%	77%	77%	76%	72%
KWAZULU-NATAL	53%	69%	72%	63%	58%
LIMPOPO	51%	71%	73%	58%	47%
MPUMALANGA	50%	54%	62%	66%	51%
NORTH WEST	63%	70%	69%	71%	68%
NORTHERN CAPE	73%	82%	77%	73%	86%
WESTERN CAPE	82%	86%	86%	81%	78%
Overall	60%	70%	72%	69%	64%

APPENDIX B

STATA OUTPUTS OF THE REGRESSION ANALYSIS

OUTPUT FOR 2000

Source	SS	df	MS			
Model	925846.311	5	185169.262	Number of obs = 3734		
Residual	1695044.48	3728	454.679312	F(5, 3728) = 407.25		
Total	2620890.79	3733	702.087004	Prob > F = 0.0000		
				R-squared = 0.3533		
				Adj R-squared = 0.3524		
				Root MSE = 21.323		

pass2000	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
DET	-45.16998	1.256489	-35.95	0.000	-47.63346	-42.70651
HoD	-22.40008	2.260466	-9.91	0.000	-26.83195	-17.96821
HoR	-21.73631	1.835718	-11.84	0.000	-25.33542	-18.1372
IS	-45.29198	1.314413	-34.46	0.000	-47.86902	-42.71494
SGT	-48.01288	1.166647	-41.15	0.000	-50.30021	-45.72555
_cons	95.0358	1.024728	92.74	0.000	93.02671	97.04488

OUTPUT FOR 2002

Source	SS	df	MS			
Model	527700.495	5	105540.099	Number of obs = 3733		
Residual	1630516.61	3727	437.487686	F(5, 3727) = 241.24		
Total	2158217.1	3732	578.300402	Prob > F = 0.0000		
				R-squared = 0.2445		
				Adj R-squared = 0.2435		
				Root MSE = 20.916		

pass2002	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
DET	-30.64662	1.232746	-24.86	0.000	-33.06354	-28.22969
HoD	-10.24995	2.217319	-4.62	0.000	-14.59723	-5.902671
HoR	-16.95952	1.800679	-9.42	0.000	-20.48993	-13.4291
IS	-41.4699	1.289325	-32.16	0.000	-43.99775	-38.94205
SGT	-29.50856	1.144379	-25.79	0.000	-31.75223	-27.26489
_cons	95.46513	1.005169	94.97	0.000	93.49439	97.43586

OUTPUT FOR 2004

Source	SS	df	MS			
Model	524597.807	5	104919.561	Number of obs = 3734		
Residual	1486815.97	3728	398.824026	F(5, 3728) = 263.07		
Total	2011413.78	3733	538.819656	Prob > F = 0.0000		
				R-squared = 0.2608		
				Adj R-squared = 0.2598		
				Root MSE = 19.971		

pass2004	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
DET	-28.15442	1.176784	-23.92	0.000	-30.46162	-25.84721
HoD	-5.772111	2.117074	-2.73	0.006	-9.922847	-1.621376
HoR	-16.85974	1.71927	-9.81	0.000	-20.23054	-13.48894
IS	-41.79035	1.231034	-33.95	0.000	-44.20392	-39.37678
SGT	-26.24145	1.092641	-24.02	0.000	-28.38368	-24.09921
_cons	95.93372	.9597248	99.96	0.000	94.05208	97.81536

OUTPUT FOR 2007

Source	SS	df	MS	Number of obs = 3734	
Model	545698.646	5	109139.729	F(5, 3728) =	267.27
Residual	1522338	3728	408.352467	Prob > F =	0.0000
				R-squared =	0.2639
				Adj R-squared =	0.2629
Total	2068036.64	3733	553.98785	Root MSE =	20.208

pass2007	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
DET	-31.25293	1.190758	-26.25	0.000	-33.58753	-28.91833
HoD	-7.867418	2.142214	-3.67	0.000	-12.06744	-3.667392
HoR	-22.72749	1.739686	-13.06	0.000	-26.13832	-19.31666
IS	-37.91201	1.245653	-30.44	0.000	-40.35424	-35.46978
SGT	-35.76405	1.105617	-32.35	0.000	-37.93172	-33.59638
_cons	94.44688	.9711217	97.26	0.000	92.5429	96.35086

OUTPUT FOR 2009

Source	SS	df	MS	Number of obs = 3734	
Model	787625.514	5	157525.103	F(5, 3728) =	375.21
Residual	1565135.9	3728	419.832591	Prob > F =	0.0000
				R-squared =	0.3348
				Adj R-squared =	0.3339
Total	2352761.41	3733	630.260223	Root MSE =	20.49

pass2009	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
DET	-35.17031	1.207381	-29.13	0.000	-37.5375	-32.80312
HoD	-10.89504	2.172118	-5.02	0.000	-15.15369	-6.636384
HoR	-26.29478	1.763971	-14.91	0.000	-29.75323	-22.83634
IS	-43.76303	1.263041	-34.65	0.000	-46.23935	-41.28671
SGT	-44.27312	1.12105	-39.49	0.000	-46.47106	-42.07519
_cons	93.17182	.9846778	94.62	0.000	91.24126	95.10238

APPENDIX C

NCSS OUTPUT OF THE REPEATED MEASURES ANALYSIS OF VARIANCE

Repeated Measures ANOVA Report

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 Response score

Expected Mean Squares Section

Source	DF	Term Fixed?	Denominator Term	Expected Mean Square
A: year	4	No	S(AB)	S+bsA
B: former department	5	Yes	AB	S+sAB+asB
AB	20	No	S(AB)	S+sAB
S(AB)	18639	No		S

Note: Expected Mean Squares are for the balanced cell-frequency case.

Analysis of Variance Table

Source	Power	Sum of Squares	Mean Square	F-Ratio	Prob Level
Term	DF				
(Alpha=0.05)					
A: year	4	177447.5	44361.86	104.67	0.000000*
B: exd	5	3086086	617217.1	54.77	0.000000*
AB	20	225386.1	11269.31	26.59	0.000000*
S	18639	7899851	423.8345		
Total (Adjusted)	18668	1.181384E+07			
Total	18669				

* Term significant at alpha = 0.05

Probability Levels for F-Tests with Geisser-Greenhouse Adjustments

Source	Huynh		Lower		Geisser	
	Feldt	Regular	Bound	Epsilon	Greenhouse	Epsilon
Term	DF	F-Ratio	Prob Level	Prob Level	Prob Level	Prob Level
A: year	4	104.67	0.000000*			
B: exd	5	54.77	0.000000*	0.001778*	0.000045*	
AB	20	26.59	0.000000*			
S	18639					

Power Values for F-Tests with Geisser-Greenhouse Adjustments Section

Source	Term	Huynh Feldt Epsilon Power DF (Alpha=0.05)	F-Ratio	Lower	Geisser
				Bound	Greenhouse
			Regular Power (Alpha=0.05)	Epsilon Power (Alpha=0.05)	Epsilon Power (Alpha=0.05)
A: year		4	104.67	1.000000	
B: exd		5	54.77	1.000000	0.999486
		1.000000			1.000000
AB		20	26.59	1.000000	
S		18639			

Repeated Measures ANOVA Report

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Covariance Matrix Circularity Section

Source	Lower Bound Epsilon	Geisser Greenhouse Epsilon	Huynh Feldt Epsilon	Mauchly Test Statistic	Chi2 Value	Covariance Prob DF Level	Matrix Circularity?
AB	0.200000	0.366349	0.660319	0.000000	0.0	14.01.000000	Okay

Note: Mauchly's statistic actually tests the more restrictive assumption that the pooled covariance matrix has compound symmetry.

Means and Standard Error Section

Term	Count	Mean	Standard Error
All	18669	70.60454	
A: year			
2000	3734	64.60059	0.3369077
2002	3733	73.99271	0.3369529
2004	3734	76.13071	0.3369077
2007	3734	71.85957	0.3369077
2009	3734	66.43911	0.3369077
B: exd			
DET	4299	60.73182	1.619067
HOA	2165	94.81067	2.281496
HOD	560	83.37375	4.485951
HOR	980	73.8951	3.391061
IS	3355	52.76522	1.832746
SGT	7310	58.05066	1.241623
AB: year,exd			
2000,DET	860	49.86581	0.7020191
2000,HOA	433	95.0358	0.9893597
2000,HOD	112	72.63571	1.945311
2000,HOR	196	73.29949	1.470517
2000,IS	671	49.74382	0.7947616

2000,SGT	1462	47.02291	0.5384241
2002,DET	859	64.81851	0.7024276
2002,HOA	433	95.46513	0.9893597
2002,HOD	112	85.21518	1.945311
2002,HOR	196	78.50562	1.470517
2002,IS	671	53.99523	0.7947616
2002,SGT	1462	65.95657	0.5384241
2004,DET	860	67.7793	0.7020191
2004,HOA	433	95.93372	0.9893597
2004,HOD	112	90.16161	1.945311
2004,HOR	196	79.07398	1.470517
2004,IS	671	54.14337	0.7947616
2004,SGT	1462	69.69227	0.5384241
2007,DET	860	63.19395	0.7020191
2007,HOA	433	94.44688	0.9893597
2007,HOD	112	86.57947	1.945311
2007,HOR	196	71.71939	1.470517
2007,IS	671	56.53487	0.7947616
2007,SGT	1462	58.68283	0.5384241
2009,DET	860	58.00151	0.7020191

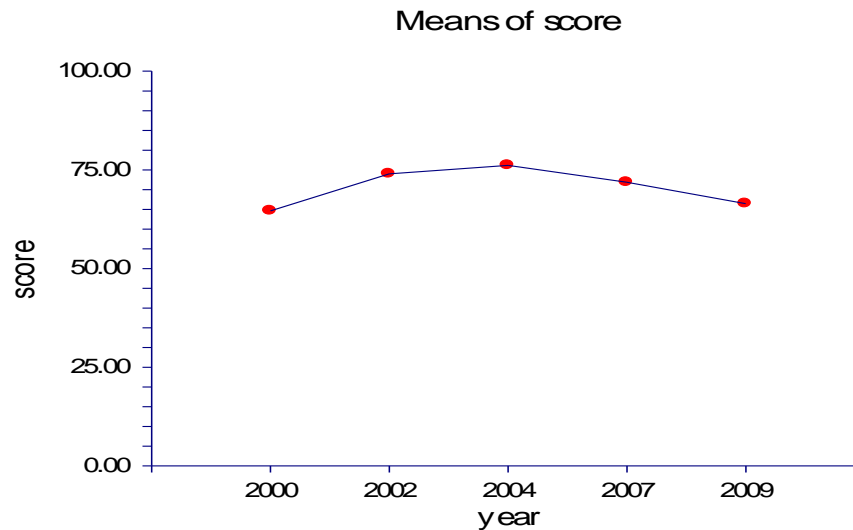
Repeated Measures ANOVA Report

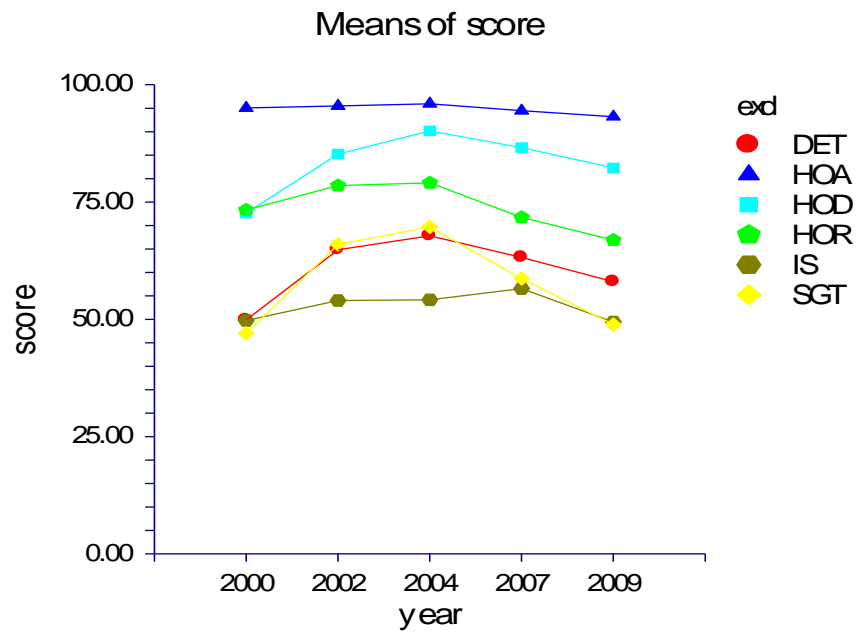
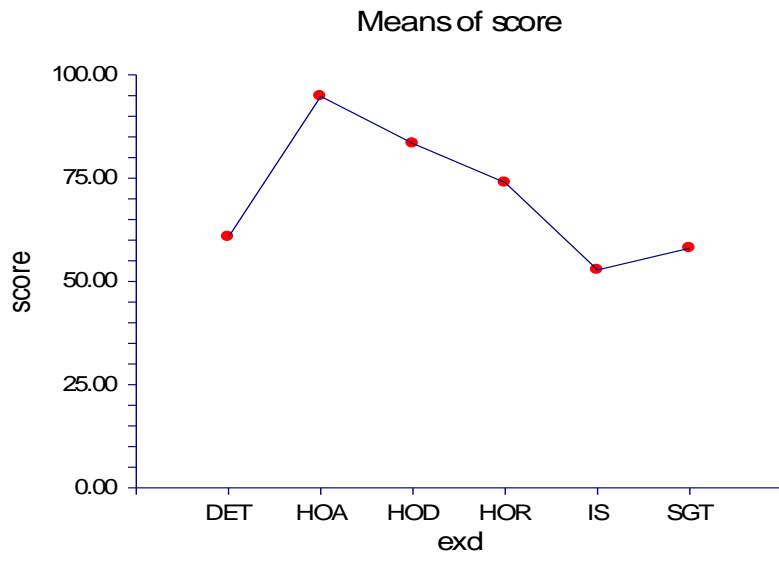
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Means and Standard Error Section

Term	Count	Mean	Standard Error
AB: year,exd			
2009,HOA	433	93.17182	0.9893597
2009,HOD	112	82.27679	1.945311
2009,HOR	196	66.87704	1.470517
2009,IS	671	49.40879	0.7947616
2009,SGT	1462	48.8987	0.5384241

Plots Section





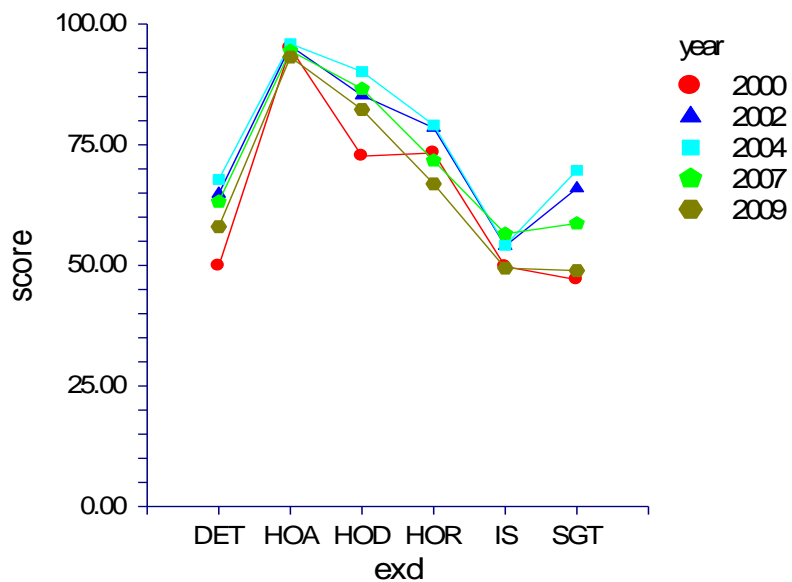
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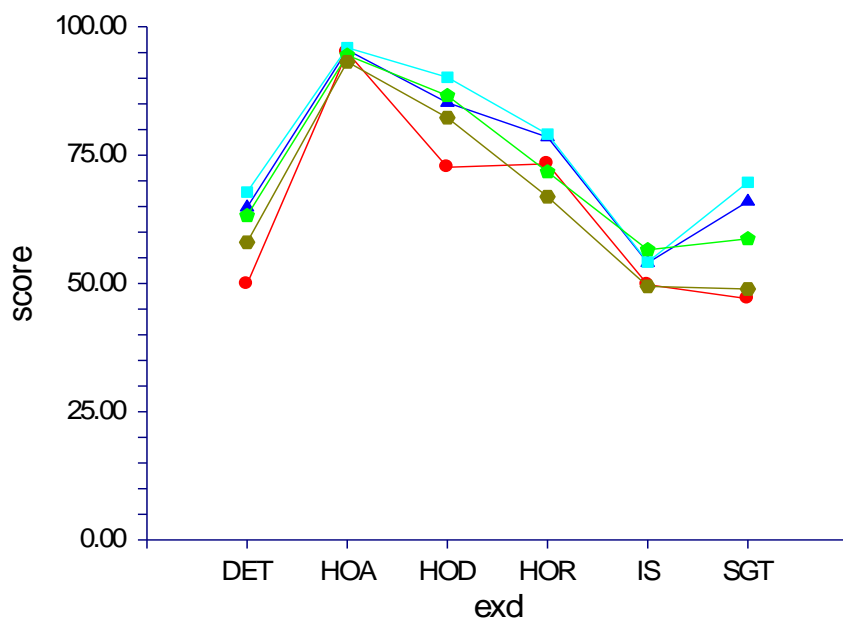
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Response score

Means of score



score vs exd by year



Tukey-Kramer Multiple-Comparison Test

Response: score

Term B: former department

Alpha=0.050 Error Term=AB DF=20 MSE=11269.31 Critical Value=4.4453

Group	Count	Mean	Different From Groups
IS	3355	52.76522	DET, HOR, HOD, HOA
SGT	7310	58.05066	HOR, HOD, HOA
DET	4299	60.73182	IS, HOR, HOD, HOA
HOR	980	73.8951	IS, SGT, DET, HOA
HOD	560	83.37375	IS, SGT, DET
HOA	2165	94.81067	IS, SGT, DET, HOR

Notes:

This report provides multiple comparison tests for all pairwise differences between the means.