EXPLORING THE FUNCTIONALITY OF THE SOUTH AFRICAN EDUCATION QUINTILE FUNDING SYSTEM

By

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DECLARATION

I, Roxanne Longueira, student number 04396928 hereby declare that this dissertation, "*Exploring the functionality of the South African education quintile funding system,"* is submitted in accordance with the requirements for the Magister Educationis degree at University of Pretoria, is my own original work and has not previously been submitted to any other institution of higher learning. All sources cited or quoted in this research paper are indicated and acknowledged with a comprehensive list of references.

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ABSTRACT

South African education has undergone many changes in the past two decades. In an attempt to educate all South African children and provide as many prospects as possible, a funding system was adopted with the intention of achieving "redress, equity and quality" (DoE, 2006). The goal of redress was important to begin solving system discrepancies between different social groups in the country whereas the goal of equity is one of the means to attain redress. The Quintile Funding System has been considered the means to achieve equity and redress. This tiered system directs more funding to those learners in need of financial support than more affluent learners. By increasing funding to learners of a lower socio-economic status (SES), learners who would otherwise be disadvantaged, could possibly reap the benefits of more opportunities through good quality education.

This study aims to investigate the functionality and relevance of the quintile funding system. By using the preProgress in International Reading Literacy Study (prePIRLS) 2011 reading literacy test results and background survey questionnaire data, the SES of each quintile is examined. The reading literacy achievement is also used as a proxy for education quality and, by examining the differences in prePIRLS 2011 reading literacy achievement of the quintiles, the levels of quality may be established. The SES and reading achievement enables a comparison between quintiles to justify the use of a five-tiered funding system. An effective funding system should ensure that the largest number of learners in the country reap the most benefits from a good quality education.

Key Terms:

The Quintile funding system, achievement, Socio-Economic Status, prePIRLS, reading literacy, Bronfenbrenner's System's Theory, quality, equity, redress

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LIST OF ABBREVIATIONS

ANA	Annual National Assessments
ANC	African National Congress
APA	American Psychological Association
C2005	Curriculum 2005
CAPS	Curriculum and Assessment Policy Statements
CEA	Centre for Evaluation and Assessment
DoE	Department of Education
DBE	Department of Basic Education
GDP	Gross Domestic Product
IDB Analyser	International Database Analyser
IEA	International Association for the Evaluation of Educational Achievement
MoESD	Ministry of Education and Skills Development
NIDS	National Income Dynamics Study
NNSSF	National Norms and Standards for School Funding
OBE	Outcomes Based Education
OECD	Organisation for Economic Co-operation and Development
PED	Provincial Education Department
PIRLS	Progress in Reading Literacy Study
RNCS	Revised National Curriculum Statement
SACMEQ	Southern and Eastern Africa Consortium for Monitoring Educational Quality
SES	Socio-Economic Status
SGB	School Governing Body
SPSS	Statistical Package for the Social Sciences
TIMSS	Trends in International Mathematics and Science Study

TABLE OF CONTENTS

DECLARATION ii

ETHICAL CLEARANCE iii

ABSTRACT v

ACKNOWLEDGMENT OF LANGUAGE EDITING vi

LIST OF ABBREVIATIONS vii

TABLE OF CONTENTS viii

LIST OF FIGURES xii

LIST OF TABLES xiv

1. CHAPTER 1: INTRODUCTION AND BACKGROUND 1

1.1. INTRODUCTION 1

1.2 THE CONTEXT FOR THE STUDY 2

1.3 PROBLEM STATEMENT 4

1.4 RESEARCH QUESTIONS 6

1.5 STRUCTURE OF THE DISSERTATION 6

2. CHAPTER 2: THE PROGRESS IN INTERNATIONAL READING LITERACY STUDY 8

2.1. INTRODUCTION 8

2.2. BACKGROUND TO PIRLS 9

2.3. PIRLS 2011 AND PREPIRLS 2011 IN SOUTH AFRICA 9

2.4. PIRLS FRAMEWORK FOR ASSESSMENT 11

2.5. READING CONTEXTS 12

2.5.1 National and Community Context 13

2.5.2 Home Context 14

2.5.3 School Context 14

2.5.4 Classroom Context 15

2.6. ASPECTS OF READING LITERACY 16
2.6.1 Purposes of reading 16
2.6.2 Process of comprehension 17
2.7. ASSESSMENT INSTRUMENTS FOR PREPIRLS 2011 18
2.7.1 PrePIRLS 2011 Reading literacy: achievement booklets 18
2.7.2 Behaviours and attitudes: questionnaires 20
2.8. PREPIRLS 2011 METHODS AND DESIGN 22
2.8.1 Sample 22
2.8.2 Translation of instruments in South Africa 22
2.8.3 Data collection 23
2.8.4 Scoring 24
2.8.5 Quality assurance 24
2.9. CONCLUSION 24
3. CHAPTER 3: LITERATURE REVIEW 25
3.1. INTRODUCTION 25
3.2. DEFINITIONS OF READING LITERACY 26
3.3. THE SOUTH AFRICAN EDUCATION LANDSCAPE 27
3.3.1 Post-1994 education 28
3.3.2 Access and Quality 32
3.3.3 Equity and Redress 34
3.3.4 Persistent Inequality in South Africa 36
3.3.5 Education as a tool for decreasing disparity 41
3.4. OVERVIEW OF ALTERNATIVE FUNDING SYSTEMS 43
3.4.1 Developed countries 43
3.4.2 Developing countries 44
3.5. THE QUINTILE FUNDING SYSTEM IN SOUTH AFRICA 45
3.5.1 Conceptualisation of the Quintile system 47
3.5.2 Challenges 51
3.6. CONCEPTUAL FRAMEWORK 54
3.6.1 Bronfenbrenner's Systems Theory 54

3.6.2 The PIRLS Assessment Framework 56
3.7. CONCLUSION 61
4. CHAPTER 4: RESEARCH DESIGN AND METHODS 63
4.1. INTRODUCTION 63
4.2. RESEARCH DESIGN 63
4.2.1 Post-positivism 63
4.2.2 Quantitative research 65
4.2.3 Secondary analysis 66
4.3. RESEARCH METHODS 66
4.3.1 Sample 67
4.3.2 General Methods 68
4.3.3 Sub-question 1 70
4.3.4 Sub-question 2 71
4.3.5 Sub-question 3 73
4.4. CONCLUSION 75
5. CHAPTER 5: ANALYSIS OF RESULTS 76
5.1. INTRODUCTION 76
5.2. READING LITERACY ACHIEVEMENT IN SOUTH AFRICA 77
5.2.1 Reading literacy achievement by Quintile 78
5.3. Cross Quintile comparison 79
5.3.1 EXOSYSTEM 79
5.3.2 Mesosystem 86
5.3.3 Microsystem 98
5.3.4 Individual system 105
5.4. SIMPLE LINEAR REGRESSION 109
5.4.1 Linear regression analysis results 112
5.5. SUMMARY OF RESULTS 114
6. CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS 117
6.1. SUMMARY OF THE RESEARCH APPROACH 119

6.1.1 Data Source 120
6.1.2 Data preparation 121
6.1.3 Data processing 121
6.2. MAIN FINDINGS 122
6.2.1 Description of the Quintiles based on the SES indicators from prePIRLS 2011? 122
6.2.2 Evidence of the statistically significant differences in reading achievement between the Quintiles 125
6.2.3 Justification for the Quintile system in reducing inequalities along SES lines 127
6.2.4 Implications of the evidence from prePIRLS 2011 for the use of a Quintile system in South Africa 130
6.3. REFLECTIONS ON THE CONCEPTUAL FRAMEWORK 131
6.3.1 Socio-Economic Status 131
6.3.2 The combined framework model 132
6.4. METHODOLOGICAL REFLECTIONS 133
6.5. LIMITATIONS OF THE STUDY 134
6.6. CONCLUSIONS 134
6.6.1 Recommendations 135
6.6.2 Main conclusion 136
7. REFERENCES 137
8. Appendicies 150
8.1. Appendix A 150
8.2. Appendix B 152
8.3. Appendix C 158
8.4. Appendix D 160

LIST OF FIGURES

Figure 2.1: PIRLS Framework for assessment (Mullis, Martin, Kennedy et al., 2011) 12
Figure 3.1: A model for illustrating the relationship between delays, accountability and education outcomes (Boateng, 2014) 39
Figure 3.2: Funding of schools in 2009 (Department of Basic Education, 2011a) 46
Figure 3.3: A model for illustrating the relationship between leakage and education outcomes (Boateng, 2014) 53
Figure 3.4: Bronfenbrenner's bio-ecological model (Lewthwaite, 2011) 56
Figure 3.5: PIRLS Framework for assessment (Mullis, Martin, Kennedy et al., 2011) 57
Figure 3.6: A nested prePIRLS 2011 Framework integrated with Bronfenbrenner's Bio-ecological Model 58
Figure 5.1: The conceptual framework for this study 77
Figure 5.2: South African reading literacy achievement by Quintile 78
Figure 5.3: Description of the area within which schools in each Quintile are located 80
Figure 5.4: Average income level of the school's immediate area 81
Figure 5.5: Percentage of learners in the school who came from economically affluent homes 82
Figure 5.6: Percentage of learners in the school from economically disadvantaged homes 82
Figure 5.7: The availability of a specialised professional to work with learners with reading difficulties 84
Figure 5.8: The availability of a teacher-aide to help learners with reading difficulties 84
Figure 5.9: The availability of an adult/parent volunteer to help learners with reading difficulties 85
Figure 5.10: Approximate number of books with different titles in your school library 87
Figure 5.11: Number of titles of magazines and periodicals the school library has 87
Figure 5.12: Total number of computers that can be used by Grade 4 Learners for instructional purposes 88
Figure 5.13: Schools reporting that their capacity to provide good education is heavily affected by sthe following shortages 89
Figure 5.14: Percentage of teachers claiming that the lack of the identified reading resources affect their teaching 90
Figure 5.15: The severity of the problem of the school building needing significant repair 91
Figure 5.16: Severity of the problem of overcrowded classrooms 92
Figure 5.17: Extent to which learners suffering form lack of nutrition limit how you teach the class 94
Figure 5.18: Percentage of classrooms that make provision for advanced readers 94
Figure 5.19: Availability of computers to Grade 4 learners in the PIRLS class to use during their reading lesson 95
Figure 5.20: Percentage of schools by Quintile with access to the internet 96
Figure 5.21: The percentage of schools by Quintiles that have a library or reading corner in the classroom 96
Figure 5.22: the amount of books in the classroom library 97
Figure 5.23: Number of magazines with different titles in your classroom library 97
Figure 5.24: Number of years that the child attends preschool, by Quintile 99
Figure 5.25: The highest level of education completed by the child's father and mother 100
Figure 5.26: Parents' highest occupational levels 101

Figure 5.27: Availability of the identified resources according to learners 102
Figure 5.28: Number of books in the home as reported by learners 103
Figure 5.29: Number of books in the home as reported by parents of Grade 4 learners 104
Figure 5.30: Number of children's books in the home as reported by parents of Grade 4 learners 104
Figure 5.31: How often learners use a computer at home 105
Figure 5.32: Relationship between using computers every day and the corresponding PV across Quintile..... 106
Figure 5.33: Number of times learners in each Quintile use computers at school 107
Figure 5.34: Frequency between computer usage at school and reading literacy achievement.. 108
Figure 5.35: How often learners borrow books from the school or local library 109

LIST OF TABLES

Table 2.1: prePIRLS 2011 International benchmarks and their corresponding scores to be obtained (Howie et al., 2012) 10
Table 2.2: Matrix Sampling Blocks for prePIRLS 2011 (Mullis, Martin, Kennedy et al., 2011) 18
Table 2.3: prePIRLS 2011 Booklet Design (Mullis, Martin, Kennedy et al., 2011) 19
Table 3.1: South Africa's Gini Coefficient 40
Table 3.2: Allocation of funds for the 5 Quintiles in 2007 and 2014 47
Table 3.3: National Poverty Distribution Table (Department of Basic Education, 2014) 49
Table 3.4: The financial allocation per Quintile in 2007 and 2014 50
Table 4.1: The population and sample sizes for South Africa (Joncas, 2011) 67
Table 4.2: Number of learners sampled in each Quintile 68

CHAPTER 1: INTRODUCTION AND BACKGROUND

1.1. INTRODUCTION

The purpose of this study is to explore the functionality and relevance of the Quintile system used to distribute funds to schools in South Africa. It aims to describe the Quintiles based on socio-economic status (SES) and reading literacy achievement using the preProgress in International Reading Literacy Study (prePIRLS) 2011 reading literacy test results and background survey questionnaire data. Another aim is to explore the differences in the reading literacy achievement between the five Quintiles, since this can be seen as a proxy for studying education quality. These Quintile descriptions and the exploration of possible differences in reading literacy achievement by Quintile will be used to evaluate the functionality and relevance of the Quintile system in South Africa.

South Africa's Department of Education (DoE) has been striving for "redress, equity and quality" (DoE, 2006) in the education system since 1994 and the Quintile funding system as outlined in the 2000 National Norms and Standards for School Funding (NNSSF)[1] was a mechanism put in place in an attempt to achieve these goals. The Strategic Plan 2011-2014 from the Department of Basic Education (DBE, 2011b) and the Action Plan to 2014: Towards the Realisation of Schooling 2025 (DBE, 2011a) detailed more mechanisms to help achieve these goals. These mechanisms included setting smaller and more specific goals as well as through teacher development, improved learning support materials, Annual National Assessments (ANAs), district development and the Accelerated Schools Infrastructure Delivery Initiative (DBE, 2011b).

These interventions and mechanisms are especially targeted at reducing the disparity between learners of high and low SES through social redress, by way of a stratification of the population based on economic status relative to other economic levels in the country. It often reinforces the social hierarchy within communities with limited movement between SES groups within a country. Moeller (2011, p. 11) writes that: "failing to provide adequate funding for the educational needs of marginalized and at-risk students, social mobility is inhibited and current

[1] The NNSSF has since been updated (in 2006) to the Amended National Norms and Standards for School Funding (ANNSSF).

class structures are maintained", but SES is defined in several ways, leading to different quantifiable measures. The most basic would be to examine a family's income (Dotson, Kitner-Triolo, Evans, & Zonderman, 2009), whilst more comprehensive measures combine income, the number of children in a family, the unemployment rate of adults, the surrounding SES of the community and perhaps levels of education achieved by parents (Harwell & LeBeau, 2010; Willingham, 2012).

There is a wide discrepancy between the low and high SES groups in South Africa and thus "the poor (generally) receive a far inferior quality of education when compared to their wealthier counterparts" (Spaull, 2013, p. 2). This inferior education quality often limits educational achievement and may reinforce the poverty cycle. The quality of education received by learners could be associated with their SES and so increases the disparity between the groups. The Department of Basic Education (DBE) aims to counteract the effects on education by targeting more funds to the lower SES learners through the use of the Quintile system and through division of schools into five categories to reflect the poverty or affluence of their area. Allocation of funds in such a way would provide less funding for the affluent and redirect it towards poorer areas, schools and learners. The lower Quintiles (1, 2 and 3) indicate a higher level of poverty, whereas Quintiles 4 and 5 should indicate more affluence.

1.2 THE CONTEXT FOR THE STUDY

The DBE published the Amended National Norms and Standards for School Funding (ANNSSF) (Department of Education, 2006; Naong, 2013), which emphasised the pro-poor (DoE, 2006) nature of education spending and reinforced the right of all to a basic education. In order to address the challenge of differing SES levels in the country a commitment was made to bring education in line with a global commitment to providing universal primary education by 2015, one of the Millennium Development Goals (MDGs) (Dieltiens & Motala, 2014; Maile, 2008; Miles & Singal, 2010).

Accessing education in South Africa has become considerably easier over the two decades since 1994, regardless of race. In 2009, South Africa claimed to have achieved near universal access to education with 98.8% of learners between the ages of 7 and 14 attending school (DBE, 2011b). Although this increase in percentage is a worthwhile achievement, the rapid expansion of the education system has prompted many debates concerning quality (Spaull, 2013b). The first of the DBE's outcomes identified in their Strategic Plan 2011 – 2014 is "improved quality of basic education" (DBE, 2011c), with targets being set to improve quality through increased accountability and effective teaching, without punishing stakeholders in the system.

Access may have come at the expense of quality, though learning quality is not easily defined. Whilst there is consensus about the need for good quality education (van der Berg & Moses, 2012) there is less agreement about how to achieve it (Marshall et al., 2012). The DBE acknowledges the need for good quality education and is taking steps to improve the quality, but this process is a long-term endeavour. Education quality is difficult to measure, especially on a national scale, so achievement is used as a proxy (Kimberlin & Winterstein, 2008). The low achievement in various cycles of international studies such as the PIRLS, Trends in International Mathematics and Science Study (TIMSS) and the Southern and Eastern African Consortium for Monitoring Educational Quality (SACMEQ) have been strong indicators of poor education quality. The ANNSSF includes commitments to good quality education as a goal but South Africa performed among the worst in the world in the PIRLS and prePIRLS studies in 2006 (Howie et al., 2006; Howie, van Staden, Tshele, Dowse, & Zimmerman, 2012).

The goal of redress in education aims to correct past injustices (Heystek, 2011; Maile, 2008; Williams, 2010), especially regarding to the education system spending discrepancies (Bell & Mckay, 2011) based on race before 1994. The effects of this disparity in spending can be felt 60 years later, with many blacks still occupying larger sections of the poorest sector of the country and whites the middle to upper classes (Bell & Mckay, 2011). The obstacle that this disparity poses is that the latter spend more on education and thus obtain better quality education (Spaull, 2013b). Quality and redress are thus inextricably linked, since

redress is needed to reduce the gap between high and low spending on education, which should then lead to an increase in the quality of education for all. This difference in quality will perpetuate a difference between classes that has been linked to violent outbreaks, and social tension along ethnic and racial lines (McLean Hilker, 2011; Strand, 2010). Stratified spending by the government in the form of the Quintile system appears to be a progressive step in providing access to education.

1.3 PROBLEM STATEMENT

Although the pro-poor approach to spending begins to address inequality, there may be a number of inconsistencies and challenges relating to the funding system. There is little justification for a five-tiered system or evidence regarding any alternative funding systems that might have been considered. The implementation of the policies has provided many challenges that have rendered the system ineffective, notably that discussed by Dieltiens and Motala (2014), in which Quintile allocations have not adequately reflected the need in communities. A reason for this problem has been the differences in poverty across the nine provinces in South Africa (Badat & Sayed, 2014; Dieltiens & Motala, 2014), with Limpopo having the greatest proportion of poverty and requiring more funding than others. Once this problem was acknowledged the responsibility for allocating poverty scores to areas and allocating funds to provinces became a national responsibility and a more centralised process, allowing for a fairer distribution of funds targeting the neediest.

Badat and Sayed (2014) argue that even after these challenges have been accounted for the Quintile system still does not measure poverty with sufficient accuracy and the Quintiles do not properly describe the SES of the area or school. Just as an incorrect poverty measurement means that the learners in most need of financial help will not necessarily receive it the incorrect allocation of schools to Quintiles also exacerbates this problem. In some instances schools in the same vicinity which draw from the same population had been placed in different Quintiles (Dieltiens & Motala, 2014). In Limpopo, any school that is located close

to a town is said to be a Quintile 4 school (Dieltiens & Motala, 2014), regardless of the SES in the area. This highlights a shortcoming in the process of school classification (Sayed & Motala, 2012a).

Another concern raised is the 'incorrect' classification of learners to a school, as the classification of schools according to areas did not make provisions for learners from other areas or even specific learners who were poor within that area. There has been a large amount of migration between schools (Dieltiens & Motala, 2014; Educational Access in South Africa, 2008), especially in Gauteng (Sayed & Motala, 2012a), and this has left the classifications out of date. Migration also affects the budget because the amount of money a school receives in the following year is determined by the number of learners in the current year (Dieltiens & Motala, 2014). With large numbers migrating there will possibly be insufficient funding for the school. The data used for the classification of schools to Quintiles has been rumoured to have been from 2001 (Dieltiens & Motala, 2014), which means that it is more than a decade out of date and school profiles have changed without their Quintile ranking having changed accordingly.

The Quintile that a school has been allocated can theoretically be changed but anecdotal evidence points to this being a challenge. Although incorrect classification should be corrected it may mean that the education department has not budgeted for an increase in funding, especially if schools attempt to be classified as 'no-fee' schools (Dieltiens & Motala, 2014). With the current system already supporting Quintile 1, 2 and 3 schools as 'no-fee' schools, the question of quality versus quantity will soon be raised again.

After considering the Quintile system and its challenges as briefly described above, this study aims to investigate the appropriateness of the Quintile system for South Africa in ensuring access, equity and redress. By describing and comparing each Quintile as evident from background data from the prePIRLS 2011 study, the similarities and differences between the Quintiles will be clear in order to justify or negate the use of a five-tiered system. The reading literacy achieved as derived from prePIRLS 2011, of the Grade 4 learners in each of the Quintiles, will also be examined in order to determine the relationship between the achievement (in reading literacy) and the Quintiles to which the schools belong.

1.4 RESEARCH QUESTIONS

Due to the challenges stated above, the following research question is asked in this study:

> What are the implications of the evidence from prePIRLS 2011 for the use of a Quintile system in South Africa?

The main research question is divided into three sub-questions, namely:

1) How can the Quintiles be described based on the SES indicators from prePIRLS 2011?
2) What are the statistically significant differences in reading achievement between the Quintiles?
3) Given the differentiation in achievement, to what extent is the Quintile system justified in reducing inequalities along SES lines?

1.5 STRUCTURE OF THE DISSERTATION

The remainder of the dissertation is structured as follows:

Chapter 2 will provide information regarding the PIRLS assessments as well as the history of PIRLS in South Africa. An understanding of the study is needed to contextualise the data, as well as understand how the prePIRLS 2011 reading literacy data can be used to assess the quality of the South African education system.

The results of a thorough literature review will be presented in Chapter 3, providing a detailed description of SES, reading achievement and the necessity for good quality education. This review also describes the South African context as well as the education environment so as to understand better the orientation of the study. The need for redress and quality are also discussed by looking at consequences of inequality and the large disparity between social groups. Finally, the conceptual framework for the study is explained in this Chapter. This

framework combines Bronfenbrenner's nested theory and the PIRLS Assessment Framework as a theoretical point of departure.

Chapter 4 explains the research design and methods used in this study, a postpositivist and quantitative piece of research, with more specifically a secondary data analysis being conducted. The methods followed to investigate each of the research questions are described, along with steps taken to ensure validity and reliability as well as steps taken to conform to ethical guidelines.

The first research sub-question is explored through the discussion of the results of descriptive statistics, in Chapter 5, which reports on the descriptive statistics of SES items selected, by Quintile, at each of Bronfenbrenner's levels. Chapter 5 also details the results of the simple regression performed, in order to answer the second sub-research question. In this Chapter the statistically significant differences between reading achievement in the five Quintiles are explored.

The final Chapter summarises the study. Chapter 6 is a thorough discussion of the results given in Chapters 5, in an effort to summarise and answer all the research questions. Policy recommendations for education funding in South Africa are made, based on the information that the study provided regarding the third sub-question, concerning the implications of the evidence for the use of the Quintile system. Reflections on the study provide a springboard for further study.

CHAPTER 2: THE PROGRESS IN INTERNATIONAL READING LITERACY STUDY

2.1. INTRODUCTION

The aim of this Chapter is to provide an overview of the administration of prePIRLS 2011 as it was conducted in South Africa, with reading literacy achievement used as a proxy for education quality. Insight is sought into the concept of reading literacy, as defined by PIRLS, and the approach followed by the IEA when conducting PIRLS is described. This study makes use of the PIRLS reading literacy framework and thus adopts many of the philosophies of large-scale testing, reading literacy and quantitative research.

Large-scale assessments are international studies that compare education transnationally, assess the transparency of the education system and measure the quality of education and level of achievement of learners: “Other purposes for learning assessments include support of teacher professional development, improved instructional design, reducing learning inequities, and more” (Wagner et al., 2012, p. 5). Although not the aim of international large-scale testing, but of benefit, is that these tests are more objective and unbiased. The data collected also has the ability to raise awareness and allow for comparison with different countries at similar developmental stages. It could thus influence policy (Wagner et al., 2012), especially in addressing shortcomings and redistributing funds to make the education system more effective, as is the case in South Africa.

The introduction presents a detailed discussion of the study and its aims, followed by a discussion of the contexts of reading literacy. The study’s design is explained in the framework for assessment, which provides information about the purposes of reading as well as the processes of comprehension of which PIRLS makes use. The assessment instruments are then introduced. Finally, section 2.8 elaborates on the prePIRLS 2011 methods and design.

2.2. BACKGROUND TO PIRLS

The Progress in International Reading Literacy Study (PIRLS), under the auspices of the International Association for the Evaluation of Educational Achievement (IEA) (Mullis, Martin, Foy, & Drucker, 2011), measures the reading literacy of learners after four years of schooling. Although it has a specific purpose of measuring literacy in an effort to better understand literacy acquisition and in turn improve it, PIRLS is also useful for "provid(ing) countries with information that can contribute to educational reform and policy analysis" (Mullis, Martin, Foy et al., 2011, p. 12). The latter purpose is also the general purpose of large-scale, standardised assessment.

In 2011, learners from 49 countries participated in this international study in PIRLS and prePIRLS, both literacy tests but with prePIRLS 2011 focussing on emergent reading literacy skills, whilst making use of shorter reading passages and easier questions in the reading literacy achievement test. Both the studies make use of the same assessment framework but the discussion in this Chapter will focus on prePIRLS 2011 in South Africa, since it is the data source for this study.

2.3. PIRLS 2011 AND PREPIRLS 2011 IN SOUTH AFRICA

PIRLS was conducted in South Africa in 2006 for the first time and the country achieved the "lowest score of all 45 education systems" (Howie et al., 2006, p. 32). Although learners are usually tested in their fourth year of formal education, both Grades 4 and 5 learners took part in PIRLS 2006, to investigate if there was any progression in reading literacy from one Grade to the other. The test was administered to both Grades, in all of South Africa's 11 official languages. Grade 5 learners achieved poorly with a score of 302 (SE=5.6) (Howie et al., 2006), with the international centre point set at 500. The Grade 4 learners performed even more poorly, with average achievement at 253 (SE=4.6) points. For participation in PIRLS 2011, the South African study assessed a nationally representative sample of Grade 5 learners who were tested in Afrikaans and English only in attempts to measure trends between PIRLS 2006 and PIRLS 2011 since Afrikaans and English were also the best performing languages in the PIRLS 2006 cycle.

South Africa opted to take part in prePIRLS 2011, an easier assessment of foundational literacy, testing Grade 4 learners in representative samples across all 11 official languages. The minimum sample required for the study was 150 schools and 4,000 learners (Howie, van Staden, Tshele, Dowse & Zimmerman, 2012) and to obtain this, a "three-stage stratified cluster sampling design was employed" (Howie et al., 2012, p. 44). The sample was chosen according to the size of the school, then random sampling of classes took place and all the learners within these were then sampled. The sample was also stratified according to the 11 official languages used in South Africa as well as the status of the school (i.e., whether the Grade 4 and/or Grade 5 learners were taking part in the study).

The prePIRLS 2011 results pointed to underperformance of South African Grade 4 learners (461, SE=3.7) compared to the international centre point of 500. Botswana scored slightly higher than South Africa, with a score of 463 (SE = 3.5). Colombia was the only country in prePIRLS 2011 to score above the international centre point, scoring 576 (SE = 3.4) (Mullis, Martin, Foy et al., 2011). Apart from providing overall achievement scores, prePIRLS 2011 also provided achievement according to four benchmarks, as depicted in Table 2.1 (below), with the scores that had to be obtained in order to reach those specific benchmarks.

Table 2.1: prePIRLS 2011 International benchmarks and their corresponding scores to be obtained (Howie et al., 2012)

International benchmark	Score to be obtained
Advanced	625
High	550
Intermediate	475
Low	400

As shown in Table 2.1, the low international benchmark is reached with a score of 400, the lowest benchmark with the following requirements:

"When reading literary texts, learners can:

• Locate and retrieve an explicitly stated detail

When reading Information texts, learners can:

• Locate and reproduce two or three pieces of information from within the text

• Use subheadings, text boxes and illustrations to locate parts of the text" (Howie et al., 2012)

As the international benchmarks increase so do their scores, i.e., 475 for the intermediate, 550 for the high and 625 for the advanced international benchmark. In order to achieve a higher benchmark a learner will be able to correctly complete more advanced questions such as "integrating ideas and evidence" and being able "to interpret story events" (Howie et al., 2012).

29% (SE=2.7) of South African Grade 4 learners did not reach the low international benchmark (Howie et al., 2012) which requires the location and retrieval of explicitly stated information. The range of learners who did not achieve the low international benchmark varies considerably, from 10% (SE = 2.2) of English learners to 57% (4.3) of Sepedi learners. This range shows disparity between language groups sampled in the data set.

2.4. PIRLS FRAMEWORK FOR ASSESSMENT

The context for learning to read profoundly relates to how reading literacy is achieved as well as how learners respond to reading. For this reason, the PIRLS Assessment Framework was drawn up in such a way that all these contexts would be considered (Mullis, Martin, Kennedy, Trong, & Sainsbury, 2011). Both the PIRLS and prePIRLS 2011 studies were informed by this assessment framework. Figure 2.1 (below), graphically represents the relationships between the contexts and their association with reading literacy.

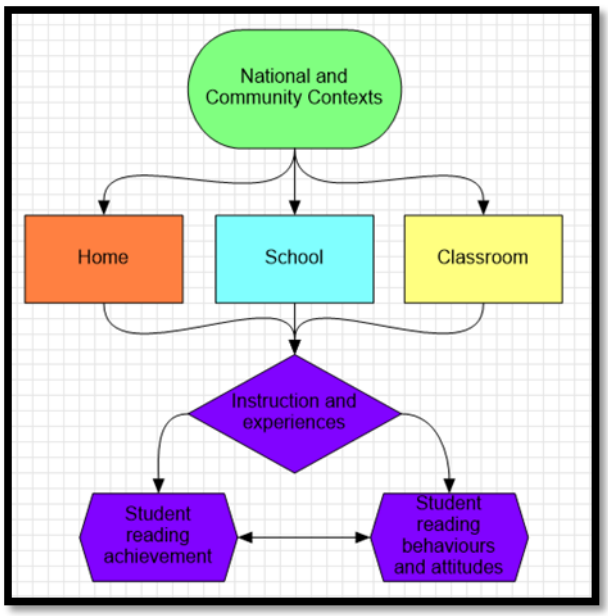


Figure 2.1: PIRLS Framework for assessment (Mullis, Martin, Kennedy et al., 2011)

Figure 2.1 (above) shows the relationships between different contexts in learning to read, as conceptualised in the PIRLS 2011 Assessment Framework. The national and community contexts are related to the home, social and classroom context, which in turn impact the instruction and experiences of reading literacy. The students' reading achievement and the behaviours and attitudes regarding reading effect one another and are dependent on the contexts above them in Figure 2.1.

2.5. READING CONTEXTS

The contextual nature of reading is important to consider, with reading development nested within the contexts surrounding a child (Mullis, Martin, Kennedy, et al., 2011). These contexts include the country, area, home situation as well as the situation of the school and the reading practices that occur there. These different contexts in which learners are situated bring with them differences in "resources, goals and organisational features" (Howie et al., 2012, p. 41). Reading is further influenced by formal practices such as being taught the alphabet at school and informal practices such as watching parents enjoy reading.

This means that a multiplicity of factors are associated with the way in which learners learn to read.

PrePIRLS 2011 considers the contextual nature of reading and the association that reading context has on the reading literacy achievement. The contextual nature of reading literacy also heavily informs this study. The following sections describe the different contexts for learning to read as conceptualised by prePIRLS 2011.

2.5.1 National and Community Context

The economic, social and political situation of a country has a large impact on all education (Mullis, Martin, Kennedy et al., 2011), effecting the education policy and the wider environment in which it is practiced. The national context for each country is published in the PIRLS Encyclopaedia (Mullis, Martin, Minnich, Drucker & Ragan, 2011, 2012), and the community is nested within the context of the country and functions within it. The education that takes place is also related to by the community.

The priorities of a country are often dictated by the social and political climate and are closely linked to its history. In a democratic society, in which leaders represent society, the politicians often reflect public opinion and encourage policy that reflects the goals of the country. In South Africa, the end of apartheid strongly influenced a progressive constitution and in turn the policy and goals of the education system. The curriculum is also set at the national level and reflects both the Constitution and education policy set, and is thus a product of the social and political will of the country. The national context heavily influences literacy education based on how a government prioritises it.

The financial situation of a country often dictates the amount of money which can be directed towards education. Many governments pay for or supplement education of the people and this requires funding for the system. The availability and quality of resources such as school buildings, sports fields and libraries are often influenced by the money available.

2.5.2 Home Context

In education, the role of the parent is as the “child’s first teacher”, and literacy is either enhanced or impeded by practices in the home. Parental engagement in literacy activities with children increases learners’ achievement (CMEC, 2013). Educated parents also tend to encourage young children to engage in pre-literacy developmental activities such as playing with blocks or looking at picture books. Literate parents tend to prioritise literacy for their children so learners then tend to enjoy and understand literacy more proficiently. Illiterate parents can also take steps to enhance their children’s literacy, especially by supporting good literacy practices and being involved in their children’s schools (Wagner et al., 2012).

The financial situation at home strongly affects all learning, not only determining the level of learning resources available to the learner but also daily routines such as eating a balanced diet and sleeping well. The daily routine may be related to how well learners are able to concentrate and take part at school. Families with limited resources often rely on the government to provide education for their children and these schools are often in the area in which the families live. Often the financial home situation is similar to that of the surrounding community and the school which services it. If these schools are not functional or ineffective, families may not have the funds to send learners to the schools of their choice. In South Africa there does however seem to be an increasing number of children commuting to schools further from their home, in search of a better education (Timæus, Simelane, & Letsoalo, 2013).

2.5.3 School Context

The school’s general attitude towards reading and learning and their prioritisation thereof will also indirectly relate to the learner (Mullis, Martin, Kennedy, et al., 2011). The leadership at the school will increase literacy achievement by actively participating in practices such as professional development, which show a willingness to improve the teacher education practice and leadership. School spending on resources that foster good literacy has shown to have a link with

good literacy practice, for example, having libraries and computers for learners or classroom buildings to accommodate learners. Schools situated in areas in which poverty is prevalent tend to have less funding and thus fewer resources, negatively impacting on learning and achievement. The environment of the school should be safe, secure and accommodating to ensure optimal learning. Learners who dislike school and feel threatened or frightened are often absent or do not learn as much as other learners. To associate learning with fear will definitely be associated with how learners enjoy literacy and might be related to their ability to obtain literacy skills (Mullis, Martin, Kennedy, et al., 2011).

Parental involvement in school can also improve achievement (Mullis, Martin, Kennedy, et al., 2011). Schools that take efforts to include parents and to keep them informed will find learners have a more positive attitude towards the school. An increase in achievement would imply an increase in literacy since this is needed for improved achievement. In South Africa, many schools have a School Governing Body (SGB) which allows for parental involvement in the running of the school. By being involved in schools through the SGB parents feel they are active stakeholders in their children's learning.

2.5.4 Classroom Context

Finally, the classroom context is related to literacy, nested within the school context, the community context and the national context. All these contexts impact the school and thus literacy instruction and experiences, and so literacy acquisition. Once again, the attitudes of the teacher and other learners can be associated with how they feel about reading, which would in turn be associated with how much they enjoy reading. The quality of teaching is determined by both the teacher's education and experience and will be related to literacy learning. Just as the resources available at the school will affect literacy learning, so too will the resources available in the class (Mullis, Martin, Kennedy, et al., 2011).

2.6. ASPECTS OF READING LITERACY

PrePIRLS 2011 consisted of a reading assessment of two aspects of reading, namely purposes for reading and processes of comprehension. In addition to the reading assessment, reading behaviours and attitudes were assessed using questionnaires administered to all participating learners, their parents or guardians, teachers and school principals. The following sections pay detailed attention to these purposes for reading, processes of comprehension and reading behaviours and attitudes as measured by prePIRLS 2011.

2.6.1 Purposes of reading

The two purposes of reading are reading for a literary experience and reading to acquire and use information. The PIRLS tests are designed in such a way that these are both equally important. Reading for a literary experience often draws on texts that are fictional and with the purpose of allowing the reader to "become involved in imagined events, setting, actions, consequences, characters, atmosphere, feelings, and ideas, and to enjoy language itself" (Mullis, Martin, Kennedy, et al., 2011, p 27). This requires the reader to interact with the text and draw meaning by 'living through' the experiences of characters. The appreciation of literature involves the amalgamation of a story with the learner's own experiences, thoughts and opinions. The questions asked in this section may be concerning the plot and character development.

"Reading to acquire and use information is generally associated with informative articles and instructional texts" (Mullis, Martin, Kennedy, et al., 2011, p. 26) and tends towards non-fiction. The retrieval and use of facts and information from the passage requires the reader to engage "with aspects of the real universe", but whereas with fictional passages it is important to notice the sequence of events, usually chronologically, factual passages may be organised differently, such as logically grouping facts together (Mullis, Martin, Kennedy, et al., 2011). The purposes of these tests may also be different, such as argumentative, persuasive or unbiased, which may be implicit and require a learner to look beyond what is explicitly stated. Diagrams and other visual information may be used and the text

structured so as to portray information differently (Mullis, Martin, Kennedy et al., 2011). An example of this different portrayal would be using a brochure or an advertisement instead of a non-fiction article.

2.6.2 Process of comprehension

The process of comprehension is influenced by previous experience and events and this creates a lens through which the learner understands the text (Mullis, Martin, Kennedy et al., 2011). The PIRLS assessment makes use of four comprehension processes:

- "focus on and retrieve explicitly stated information
- make straightforward inferences
- interpret and integrate ideas and information
- examine and evaluate content, language, and textual elements."(Mullis, Martin, Kennedy, et al., 2011)

To "focus on and retrieve explicitly stated information", concerns knowledge, the most basic and lowest-order thinking skill in Bloom's taxonomy. This type of thinking draws on the ability to understand the question and identify answers from the text. The ability to make straightforward inferences would fall in the category of basic application. The learner must understand enough to extrapolate more information than explicitly stated in the text. Interpreting and integrating ideas and information draws on analysis and synthesis skills with learners required to deconstruct what is given as well as reconstruct it to make it meaningful for themselves, drawing on experience and prior knowledge. Finally, they examine and evaluate higher order thinking skills and only learners who have mastered the language at this level would be able to correctly and intuitively be able to "examine and evaluate content, language, and textual elements" (Mullis, Martin, Kennedy et al., 2011, p. 34).

2.7. ASSESSMENT INSTRUMENTS FOR PREPIRLS 2011

Figure 2.1 showed the relationships between different reading contexts and how these affect reading instructions and experiences. These instructions and experiences in turn affect reading literacy achievement and learner behaviours and attitudes. The following two sections discuss how reading literacy achievement and behaviours and attitudes are measured in prePIRLS 2011.

2.7.1 PrePIRLS 2011 Reading literacy: achievement booklets

In an effort to accommodate more developing countries in the PIRLS assessments, prePIRLS was developed as an alternative (Wagner et al., 2012) with shorter reading passages and less higher-order reasoning. Whereas PIRLS 2011 texts are no longer than 800 words, prePIRLS 2011 would be about 400 words long (Mullis, Martin, Kennedy, et al., 2011). Even with different lengths of texts the goal is still to "replicate an authentic reading experience with materials that are engaging and familiar to students" (Mullis, Martin, Kennedy, et al., 2011, p. 77). The full prePIRLS 2011 test would take a learner four hours to complete, too long and strenuous for a Grade 4 learner, so in order to avoid this problem the test was divided into six blocks of 40 minutes. Table 2.2 (below) shows that there are three sections for both purposes of reading, with L1-L3 catering for reading for a literary experience and I1-I3 assessing reading to acquire and use information.

Table 2.2: Matrix Sampling Blocks for prePIRLS 2011 (Mullis, Martin, Kennedy et al., 2011)

Purpose for reading	Blocks		
Literary experience	L1	L2	L3
Acquire and use information	I1	I2	I3

There are nine combinations of these six blocks which have been compiled to form nine different reading booklets, the combinations of which are shown in Table 2.3 (below).

Table 2.3: prePIRLS 2011 Booklet Design (Mullis, Martin, Kennedy et al., 2011)

Booklet	Part 1	Part 2
1	L1	L2
2	L2	L3
3	L3	I1
4	I1	I2
5	I2	I3
6	I3	L1
7	L1	I1
8	I2	L2
9	I3	L3

The reason for the different combinations compiled into different booklets is to ensure comparability between the different blocks as well as to standardise them all. PrePIRLS 2011 scores for the reading achievement are given as Plausible Values (PV), such that a predicted or expected score for the complete prePIRLS 2011 study (with all six blocks) is given to each learner based on their performance in the one booklet (consisting of two blocks) they complete.

The four processes of comprehension are all tested in each booklet. Table 2.4 (below) shows how the prePIRLS 2011 assessments are structured, based on the processes of comprehension.

Table 2.4: Percentages of the prePIRLS 2011 reading assessments devoted to reading processes (adapted from the PIRLS 2011 Assessment Framework) (Wagner et al., 2012)

	prePIRLS 2011
Processes of comprehension	
Focus on and retrieve explicitly stated information	50%
Make straightforward inferences	25%
Interpret and integrate ideas and information	
Examine and evaluate context, language and textual elements	25%

In prePIRLS 2011, there is a strong emphasis (50%) on "focus(ing) on and retriev(ing) explicitly stated information". About 25% of the test concerns making straightforward inferences as a process of comprehension. Table 2.4 (above) shows only 25% of prePIRLS 2011 focus on higher order skills which include interpreting and integrating ideas and information, as well as examining and evaluating contexts, language and textual elements. With such a high proportion (75%) of the achievement test based on lower order thinking skills, the prePIRLS 2011 study focuses on basic skills development as opposed to more difficult cognition.

2.7.2 Behaviours and attitudes: questionnaires

In prePIRLS 2011, contextual data is collected using behaviours and attitude questionnaires completed by the school principal, the teacher, the parent or guardian and the learner themselves. Because of the contextual nature of reading

literacy acquisition, the questionnaires seek to obtain more information about the learner's context. These questionnaires do not determine the reading literacy test score but do enable researchers to make valuable connections between the literacy scores and the context within which learners are functioning.

The national and community context is obtained when the National Research Coordinators answer a questionnaire about the curriculum followed in the country (Mullis, Martin, Kennedy et al., 2011). This information is compiled from each country and published in the PIRLS 2011 Encyclopaedia.

2.7.2.1 Learner questionnaire

The learners complete a questionnaire which helps provide information about their own attitudes and feelings toward literacy as well as provides information about other contexts in which they are nested. For example, learners may report on some of the resources they have at home (home context) or how much homework they are given (school context).

2.7.2.2 Learning to read survey (Parent questionnaire)

Information pertaining to the home context of learning is predominantly obtained from a questionnaire answered by the parent or guardian of the learner. This "learning to read" questionnaire focuses on emergent literacy practices, the attitudes towards literacy of the parent, school preparedness as well as the current home situation regarding resources (Mullis, Martin, Kennedy et al., 2011).

2.7.2.3 Teacher questionnaire

The teacher completes a questionnaire that pertains to instructional activities that take place in the classroom as well as the teacher's experience and qualification. The general school environment and resources available from home and at the school are also topics surveyed in the questionnaire.

2.7.2.4 School questionnaire

The school information questionnaire, completed by the principal of the school, obtains information about the "school characteristics, instructional time, resources and technology, parental involvement, school climate for learning, teaching staff, the role of the principal, and students' reading readiness" (Mullis, Martin, Kennedy et al., 2011, p. 79).

2.8. PREPIRLS 2011 METHODS AND DESIGN

This section looks at the methods and design of prePIRLS 2011.

2.8.1 Sample

The prePIRLS 2011 sample for South Africa was drawn from a population of 962,209 Grade 4 learners from 15,339 schools (Joncas, 2011). The attained sample consisted of 15,744 learners from 341 schools (Howie et al., 2012; Joncas, 2011) across all nine provinces. The prePIRLS 2011 sample was stratified by language and is therefore representative of learners across the 11 official languages, but not of province.

2.8.2 Translation of instruments in South Africa

PrePIRLS 2011 was developed by the International Study Centre (ISC), in English, then distributed to the different countries for translation (Howie et al., 2012). The ISC provides guidelines and processes of standardisation to ensure all passages are equivalent and the results comparable across languages and countries. Since prePIRLS 2011 was to test learners from all 11 official languages in South Africa, the test needed to be translated into the remaining 10 languages. The instruments had to be contextualised for South African learners so professional translators were appointed in the country for accuracy. Only the

learner and parent questionnaires were translated into the remaining 10 languages, since teachers and principals were expected to have a functional knowledge of English in order to have qualified as teachers (Howie et al., 2012). The translated instruments were then sent to the IEA secretariat where independent translators were appointed to verify the accuracy of the translation. In the case of South Africa, having 11 official languages, the IEA only verified the seven most spoken languages (Howie et al., 2012). The National Coordinating Centre undertook additional quality control measures to ensure the remaining four instruments in the other languages were correct.

2.8.3 Data collection

Data collection was challenging since 176 different prePIRLS 2011 instruments, representing all 11 languages, were coordinated. Before the data collection began, the "instruments were randomly assigned to learners" (Howie et al., 2012, p. 47) in order to label and pack correctly, in order for the process to run smoothly. The Centre for Evaluation and Assessment, employed a market research company to carry out the data collection, after fieldworkers and fieldwork supervisors had been trained. This was to "ensure a standardised procedure and compliance with the strict guidelines for testing and data collection by the IEA" (Howie et al., 2012, p. 47).

During October and November 2011, the data collection took place, involving one day on which learners were required to write two 40-minute tests, followed by a 30-minute background questionnaire. A mandatory break was observed between each session. The teacher and principal questionnaires were also administered and collected during this time. The parent questionnaire was sent home with the learner, after completing their tests and returned the following day (Howie et al., 2012).

2.8.4 Scoring

Scoring took 99 scorers, eight weeks to score 19,256 instruments (Howie et al., 2012). These scorers were students and retired teachers who had been "trained over a three-day period using the comprehensive scoring guidelines provided by the IEA". The computer program, WinDEM, was developed by the IEA to help scorers capture the data correctly (Howie et al., 2012).

2.8.5 Quality assurance

Quality assurance was accomplished through a number of measures throughout the study, one of which was to verify 100% of the data collected in South Africa, instead of the mandatory 5%. Another measure was having CEA members visiting 10% of sampled schools at random to ensure that data collection procedures were followed as prescribed by the IEA. There was also an International Quality Control Monitor appointed to independently quality assure the data collection activities at a sample of schools. This monitor reported directly to the IEA.

2.9. CONCLUSION

PrePIRLS 2011 provides a valuable opportunity for South Africa to use information about reading literacy to improve the education system. The poor achievement of learners in the study, even though it was substantially easier than PIRLS 2006, is concerning. This disappointing result should encourage South African policymakers and education specialists to lobby for radical change and improvement to ensure the country achieves better in the future, in order to mould literate adults, able to make better contributions to the economy. This may be achieved through providing educational opportunities for all learners, regardless of affluence or disadvantage. The Quintile system aims to do this but the efficacy of this is being investigated.

CHAPTER 3: LITERATURE REVIEW

3.1. INTRODUCTION

As then South African deputy President, Cyril Ramaphosa said at a speech delivered at a library in Cape Town, “Reading (is) essential for freedom and a better future” (South African Press Association, 2015). To prioritise an education system that facilitates quality learning and thus good reading, would be beneficial for South African citizens and national development overall. The country’s complex history has resulted in economic inequality which extends to disparities in education, compounded by differences in access to resources. A Quintile funding system has been implemented to address these problems of inequality and improve the overall quality of the education system.

This literature review begins by highlighting the context prior to 1994, since when the education system has changed substantially, with SES rather than race determining funding. The structure and curriculum have also changed substantially in the last two decades as the country has become more accepting of the potential role assessment can play. The goals of access, quality, equity and redress reflect a new approach to education, put into place to narrow the gap between the affluent and the disadvantaged. Education is the vehicle for this reform.

This chapter provides an overview of reading literacy and how it is defined for purposes of prePIRLS 2011. Section 3.3 provides a detailed discussion on the education landscape in South Africa. In an effort to explore other funding systems, section 3.4 describes the United States of America (USA) and England’s approach to education funding. South Africa may face challenges similar to those of developing countries, therefore the funding system in two countries, Botswana and Colombia, are also examined. The chapter continues with a discussion on the Quintile system (section 3.5), including its challenges, as currently used in South Africa. Finally, the conceptual framework of this study is discussed in section 3.6. This study makes use of Bronfenbrenner’s bioecological systems theory combined with the prePIRLS 2011 Assessment Framework.

3.2. DEFINITIONS OF READING LITERACY

As Roberts (1995) observes, a set definition for 'literacy' is problematic, often because of a political agenda, especially in the third world where funding depends on enhancing this agenda. Roberts (1995) lists three categories of literacy, firstly quantitative, measured by the number of years a person has attended school, and thus an assumption that they can read and write. Secondly, the qualitative category moves away from defining reading in a way that can be measured and focuses more on the qualities a person possesses when thought of as being literate. Some definitions here are less solid, with ideas such as understanding symbolic information and competencies in communication. Thirdly, the pluralist category redefines literacy in terms of subject matter, such as mathematical literacy or social literacy, with each sub-category involving different skills to be mastered.

PIRLS focuses on reading literacy within the wider context of literacy, which includes other forms of communication such as oral and body language (Dixon, Place, & Kholowa, 2008). Reading literacy may be defined as the "the ability to understand and use those written language forms required by society and [or] valued by the individual" (Mullis, Martin, Kennedy, Trong, & Sainsbury, 2011, p. 17). According to Van Staden and Howie (2014), "(m)eaning is constructed in the interaction between reader and text in the context of a particular reading experience", with reading literacy understood as both a social and cultural practice (Dixon et al., 2008; Van Staden & Bosker, 2014, p. 1), which may be both constructive and interactive (Van Staden & Bosker, 2014; Van Staden & Howie, 2014) as learners are expected to construct meaning from reading, both for entertainment and informational purposes (Mullis, Martin, Kennedy et al., 2011).

A literate population is instrumental in gauging economic growth, with the Human Development Index measuring development of people in a country, including life expectancy, knowledge and standards of living. Knowledge is measured by the literacy level and years of schooling (Doces, 2011), with a high literacy rate thus being a good indicator of human development in a country. According to Angner,

Miller, Ray, Saag, & Allison, (2010, p. 3), the “inclusion of literacy in such indices may be justified by arguing either that literacy is a good in itself or that it is conducive to (or at least sufficiently correlated with) other positive outcomes”. These positive outcomes include increased human capital, higher wages and greater GDP (Kaarsen, 2014; Schultz, 1961; Taylor & Spaull, 2013). According to Miller (n.d.) “Economists have demonstrated that both individuals and societies gain from the investments made in schooling” (Miller, n.d.).

3.3. THE SOUTH AFRICAN EDUCATION LANDSCAPE

Education “transmits culture, trains people for specialized roles and is simultaneously a force of continuity and change” (Johnson, 1982, p. 2), its power residing in the relationship between education and society, with each relating to and reinforcing the other. There is a cultural and societal element present in education, just as it is present in literacy and in turn reading literacy. Change in society can therefore be brought about through changes in education, which is an effective tool of control and was used against certain people through laws and policies during apartheid in South Africa (Books & Ndlalane, 2011; Leibbrandt, Woolard, Finn, & Argent, 2010; Sayed & Ahmed, 2011). In 1953, the Bantu Education Act was passed to allow the government to control all schools, including the previously semi-private mission ones attended by black South Africans. The goal of education at that time was to ensure “white superiority and dominance in the economy and state” (Chisholm, 2012, p. 5). The Bantu schools’ curriculum was limited since the focus was to equip African learners for menial jobs or simple manual labour (Johnson, 1982). African learners were at a distinct disadvantage in academic circles due to undereducated parents and limited economic resources caused by economic exploitation over a number of generations (Fiske & Ladd, 2004b).

The Bantu Education Act, Act 47 of 1953, (Bell & Mckay, 2011) ensured that expenditure on the education of white learners far outweighed that on black learners. In 1982, for instance, the government spent an average of 146 rand on each black learner compared with 1,211 rand on a white counterpart (Badat &

Sayed, 2014). Since few people had the means to pay for alternatives to government education there were few other options, with black African learners receiving inferior education (Chisholm, 2012), not only because of limited spending but also through lack of qualified teachers, much larger numbers in class and few if any physical classrooms or buildings. For people born in 1940, the average educational attendance was, for “Africans four years, Coloureds six years, Asians eight years and Whites 11 years” (Fedderke & Simkins, 2012, p. 180), that is almost three times more for whites over black Africans, a gap that had not narrowed by the 1960s (Chisholm, 2012).

3.3.1 Post-1994 education

Education is heavily rooted in both the politics and economy of a country. With a new government elected in 1994, education was regarded as the predominant approach to promote large-scale social change and economic prosperity and redistribution. The 1990s also saw an international movement for educating more people, especially in sub-Saharan Africa (Fiske & Ladd, 2004a; Lewin & Sabates, 2012), reinforced by the Millennium Development Goals (MDGs) which promoted universal access to education, among other goals (Chisholm & Wildeman, 2013). Those for South African education after 1994 related to access as well as “redress, equity and quality” (Department of Education, 2006).

3.3.1.1 Changes to Education Structures

The structure of the education system has changed since 1994. Apart from repealing many of the apartheid policies, such as the Bantu Education Act and the Bantu Homelands Citizenship Act, there have been structural changes to the organisation and management of education. Before 2009, the national body responsible for education was the Department of Education (DoE), under the leadership of the Minister of Education (Department of Basic Education, 2011b; Fiske & Ladd, 2004a). The DoE has since been divided into two parts, responsible for different sections of education (Department of Basic Education, 2011b). Firstly, the Department of Basic Education (DBE) was established to coordinate schools,

both public and private, dealing with education of learners until the Further Education and Training (FET) phase (Department of Basic Education, 2013a). This FET phase ensures progress to Grade 12. The Department of Higher Education and Training (DHET) is responsible for post-matric education, including colleges, universities and other adult and higher education institutions (Department of Basic Education, 2013; The Educational System of South Africa, 2012).

Whereas the Department of Basic Education operates on the national level, Provincial Educational Departments (PEDs) coordinate education in each of the nine provinces in the country (Department of Basic Education, 2013a; Fiske & Ladd, 2004a). Within these provincial structures, 81 districts also exist at a local level (Department of Basic Education, 2011a). Within a school there will also be a principal and a body of teaching and admin staff, accountable to the PEDs. Many schools also have their own School Governing Body (SGB) which comprises "juristic persons and representative bodies, with parent representatives constituting the majority" (Department of Basic Education, 2013, p. 14) SGBs have been tasked with supplementing resources to schools in order to improve the quality of education at the relevant school through empowering local communities by "increasing community control over school resources and participation in school affairs" (Sayed & Motala, 2012a). Fees and criteria for fee exemption for the following year are also set by the SGB (Fiske & Ladd, 2004a), but it may not intervene in the school management as this is the responsibility of the principal and PEDs (Department of Basic Education, 2013a).

3.3.1.2 Curriculum

After the democratic elections in South Africa in 1994, the government also sought to completely rework the curriculum taught in schools. The first curriculum was Curriculum 2005 (C2005), launched in March 1997 (Jansen, 1998; Maodzwa-Taruvinga & Cross, 2012; OECD, 2008; Sayed & Ahmed, 2011). Based on Outcomes-Based Education (OBE), C2005 made a substantial departure from the traditional schooling model used in the apartheid years (Jansen, 1998; Sayed & Ahmed, 2011). This curriculum placed emphasis on child-centred learning instead

of teacher-centred learning (Maodzwa-Taruvinga & Cross, 2012; OECD, 2008), with a focus on skills development instead of traditional academic knowledge. It made use of learning areas instead of subjects, with changes motivated by a wish to combine the ideas of education and training in such a way that they would strengthen the workforce with usable skills (Jansen, 1998).

C2005 faced significant challenges, as predicted by Jansen in his listing of 10 “principal criticisms of OBE” (Jansen, 1998), in its early years calling it “an opaque policy doomed to failure” (as cited in Maodzwa-Taruvinga & Cross, 2012, p. 128). Jansen sighted reasons such as “poor understanding of OBE by teachers, lack of materials and content specification (and) obscure terminology” (as cited in Maodzwa-Taruvinga & Cross, 2012 p. 129). Lack of teacher training in OBE (Taylor, Van der Berg, & Burger, n.d.) led to confusion and little clarity about the expectations from the teachers, resulting in many simply arranging activities around group work (OECD, 2008). Teachers also complained about the increased amount of administration and paperwork that they were expected to complete (Taylor et al., n.d.). In retrospect, even a departmental task team described C2005 as being developed enthusiastically, if hastily, since it was “never researched or properly trialled, and there was inadequate preparation and consideration of whether teachers, pupils and the system in general were prepared for such a fundamental change over such a short space of time” (Dada et al., 2009, p. 12).

C2005 was replaced by the Revised National Curriculum Statement (RNCS) in 2002 (Dada et al., 2009; Howie et al., 2006; OECD, 2008). Although there were changes, the RNCS retained its OBE initiative and learner-centeredness (Department of Basic Education, 2011b), but with a greater emphasis on lifelong learning and creation of multi-skilled citizens (Department of Basic Education, 2011b; OECD, 2008). There was freedom to merge C2005 with the RNCS but this created more confusion (Dada et al., 2009). There was no clarity of message or national plan to communicate its advantages, and again teacher training was inadequate, labelled as ‘superficial’ (Dada et al., 2009).

In 2009, the RNCS was replaced by another curriculum, the Curriculum and Assessment Policy Statement (CAPS) (Department of Basic Education, 2011b, 2013a; Sayed & Motala, 2012b). The Annual Report of 2010/2011 of the DBE

stated that this curriculum made a commitment to “Teachers, Texts and Time” (Department of Basic Education, 2011b) by developing a clear curriculum which included the reworking of textbooks and learning materials to compliment it (Department of Basic Education, 2011b). Emphasis was also placed on teacher training (Kanjee & Sayed, 2013; Sayed & Motala, 2012b):

> The Department acknowledges that CAPS is not a panacea for implementation challenges. It asserts though, that the simplification of the curriculum will go a long way in assisting with overcoming other barriers to quality education. (Department of Basic Education, 2013, 167)

Spaul, a harsh critic of the education quality in South Africa, has described CAPS as a “move in the right direction” (Spaull, 2013c), although among its challenges is a lack of direction and guidance regarding informal assessment, while formal assessment is clearly outlined (Kanjee & Sayed, 2013).

3.3.1.3 The role of assessment

The South African government, led by the ANC, began to acknowledge the potential role that large-scale assessment could play in the improvement of the education system. The country participated in various cycles of international studies, such as the Southern and Eastern Africa Consortium for Monitoring Educational Quality (SAQMEQ), the Trends in International Mathematics and Science Study (TIMSS) and the Progress in International Reading Literacy Study (PIRLS) (Foy, Brossman, & Galia, 2011; Khosa, 2010; Sayed & Motala, 2012b). An increase in large-scale assessment strengthened hopes about the will to improve quality in education. By examining results and comparing the data with that for other countries at similar developmental stages, conclusions could be drawn about plans for progress and improvement.

Testing at a national level has been taking place for many years, and “The most standardized and regular form of systemic testing in South Africa has been the National Senior Certificate (previously ‘Matric’) examinations” (Dada et al., 2009, p. 29). This exam is written at the end of Grade 12 and is required for many

institutions should a learner wish to study further. The “strong focus on testing” is also seen through the implementation of the Annual National Assessments (ANAs) which “test the quality of language and mathematics learning in all public and government-subsidised independent schools” (Sayed & Motala, 2012b. p. 4). The ANAs are written across the country at Grades 1 - 6 and 9 (Spaull, 2013c). Concerns raised by teachers in the system include one that these tests are marked by teachers within the school, with only a small sample being sent to central checking venues. The samples are selected before teachers mark, and they tend to mark the selected scripts more strictly. Other concerns voiced are the tests being too easy, mistakes on the question papers, ambiguous questions and incorrect memos.

The ANAs do however still provide policymakers and education specialists with a large amount of data which enables them to make more informed decisions, especially at primary school level. This kind of data was not previously available and made it difficult to compare school quality across the country (Spaull, 2013c). There are limitations to the use of the ANA results because learning is not properly measured, so schools cannot be held directly responsible for the results that individual learners achieved. The issue of a lack of comparability between the 2011 and 2012 ANAs, identified by academics, did call into question the large improvement in results between these two years, as well as the quality of the feedback to all educational stakeholders (Spaull, 2013c). The potential and reality of how large-scale testing can benefit the country is often debated, however, acknowledgement of the potential is insufficient to make the difference required by the education system.

3.3.2 Access and Quality

Because of a legacy of gross inequality from the previous political system, access to education was and still is a challenge for the poor. The South African government has implemented a pro-poor policy (Lewin & Sabates, 2012; van der Berg & Moses, 2012) of spending and has thus undertaken to provide education to learners at reduced rates, in some cases free, based on the socio-economic status (SES) of their family, community and school. The DoE has used income,

dependency ratio and education level (Department of Education, 2006) of a population to determine the poverty score as a reflection of the SES in a specific geographical area. The current funding[2] system used for education is known as 'Quintile ranking' (Branson, Kekana, & Lam, 2013; Dieltiens & Motala, 2014), according to the National Norms and Standards for School Funding (NNSSF) (Department of Education, 1996). It is "a mechanism for ranking schools on the basis of poverty in order to reallocate recurrent expenditure from the least poor to the poorest schools" (Dieltiens & Motala, 2014, p. 70).

Although South Africa boasts near universal education access for children from seven to 15 years of age, Simkins (2011, p.9) describes it as a "low quality mass system". The overriding argument in much of the literature is that the increase in access has come at the expense of the quality of education. Even though learners have access, attendance and learning are not necessarily keeping pace (Badat & Sayed, 2014; Mestry & Ndhlovu, 2014) and "despite substantial government interventions in the education system, equity has not been fully realised" (Mestry & Ndhlovu, 2014, p. 1). The issue of low quality education has implications beyond low standardised test scores (Graven, 2014) and is an embarrassment for the country, often occupying last or near-to-last placement in these international tests. Badat and Sayed (2014, p. 129) argue that "education in South Africa generally fails to enhance the freedom of all", the largest and most politically significant goal that the citizens sought.

The phenomena of access at the expense of quality is not unique to South Africa since trends of this kind have also been witnessed in sub-Saharan countries such as Malawi, Kenya, Nigeria, Tanzania, Uganda and Zambia (Lewin & Sabates, 2012), all of which prioritised all children. Teacher supply and infrastructure have been overextended with increasing numbers of learners being kept back from the next Grade. This Grade repetition leads to an increased number of over-age learners in a Grade, an indicator of a lack of quality within the education system (Lewin & Sabates, 2012).

[2] The funds referred to here are specifically non-personnel funding (Department of Education, 1998; Dieltiens & Motala, 2014; Sayed & Ahmed, 2011; Sayed & Motala, 2012a) for public schools.

Another concern is that even though there may be claims about near-universal access, the drop-out rate for South African schools is high, especially in the higher Grades (Devlin, Kift, & Nelson, 2012; Spaull, 2013c; Taylor, 2012). Of the "number of learners enrolled in Grade 1, only half make it to Grade 12" (Modisaotsile, 2012, p. 1). Although a multiplicity of factors from the home, such as child-headed households and sickness, could be associated with the drop-out rate there are also school-based factors such as learners being ill-prepared for the next Grade. This challenge again relates to the quality of the education being provided to South African learners.

According to Wagner (2010), measuring learning and the quality of education has long been contentious, especially when comparing international test results between countries or population groups. Some believe that "it is the quality, not the quantity of schooling that is linked to economic growth" (Breton, 2011, p. 2) and thus the lack of quality seen in the education system will inevitably affect economic growth in South Africa. The ideal situation would be that "as nations devote more resources to their schooling systems, they simultaneously raise the quantity and the quality of schooling" (Breton, 2011, p. 7). This aspiration has not yet been achieved in South Africa (Graven, 2014).

3.3.3 Equity and Redress

Just as reading literacy is a contextually dependant practice, so too is education (Mullis, Martin, Kennedy, Trong, & Sainsbury, 2011). The national context of a learner impacts learning in the classroom so learners from poor areas or low SES groups tend to have little support academically from uneducated parents, and suffer from lack of basic need fulfilment. These factors may in turn affect a learner's educational achievement and progress (Faber, Laurie, Maduna, Magudulela, & Muehlhoff, 2014). Because of the differing social contexts a driving force in the post-1994 education system has been equity rather than equality. Equal funding would mean the same funding for every learner and not address problems that the previous education systems created, whereas equitable funding would be fairer. An equitable system is based on "positive discrimination" (Badat & Sayed, 2014, p. 129) in order to redress past inequality, hence discrimination is

practiced for the good of the country and the steps taken to discriminate will lead to redress and a more equal society.

Linked to access is the issue of attainment, and the “increase in cognitive skills (will) drive economic development” (Breton, 2011, p. 7). The strengthened educational attainments should lead to economic growth (Wagner, 2010) for the country as well as increased opportunity for the individual. The benefits of a better educated workforce “include lower unemployment rates, increased tax revenues, greater civic and volunteer participation and lessened dependency on social services” (Salmi & Bassett, 2012, p. 2). The equity in the education system should thus lead to economic and social redress. The original design of the Quintile system is such that the neediest learners receive the most funding and the least needy receive the least funding. Although this system is certainly not equal it is considered equitable (Department of Basic Education, 2011a), providing more financial support where needed to compensate for the deficit of financial support from the homes and schools of the learner (Department of Basic Education, 2011a).

According to Mestry and Ndhlovu (2014, p. 1), “despite substantial government interventions in the education system, equity has not been fully realised”. The fairness in funding has not translated into fair opportunities for all lower SES learners to date, and the lack of quality in education means that many remain illiterate and unable to do basic numeracy. In both PIRLS 2011 and prePIRLS 2011, South African learners were “performing at a low level overall on an easier assessment compared to their counterparts internationally” (Howie, van Staden, Tshele, Dowse, & Zimmerman, 2012, p. 19), whilst performance in large scale studies, such as TIMSS, has been described as “extremely weak” (van der Berg, 2008). This poor performance in turn puts learners at a distinct disadvantage, essentially only preparing them for menial jobs and manual labour for which academic achievement is not required (Boateng, 2014). The opportunities for future employment are therefore not equitable and poor SES learners are less likely to reach self-actualisation (Salmi & Bassett, 2012).

3.3.4 Persistent Inequality in South Africa

The effects of the disparity created by a separated education system can still be felt over 60 years after the Bantu Education Act was passed. Many blacks still constitute the poorest sectors whereas most whites make up the middle to upper classes (Bell & Mckay, 2011). Although national levels of poverty have dropped since the end of apartheid there has been a broadening in inequality (Graven, 2014). The following section describes inequality in terms of indicators of SES and how it has related to education. The disparities between varying levels are clearly visible in education spending and entrench disparity.

3.3.4.1 Indicators of Socio-Economic Status

SES is a classification of the population according to certain variables relating to the access and possession of resources that society values (Fergusson, Horwood, & Boden, 2008; Harwell & LeBeau, 2010). These relate, inter alia, to financial indicators and reflect a hierarchical relationship in social standing (Fergusson et al., 2008; Harwell & LeBeau, 2010; Solari, 2012). Generally, a high SES implies relative affluence, access to resources and often more opportunities, whilst low SES is the opposite. This description is not particularly effective or meaningful in studies that use SES as a variable, rather it should be measured quantitatively with specific factors strongly related to it (Harwell & LeBeau, 2010; Raag et al., 2011), such as “income, education, prestige, wealth, or other aspects of standing that members of society deem salient” (Fergusson et al., 2008, p. 2).

Because of a lack of consensus on a universal meaning of SES (Fergusson et al., 2008), it is often measured indirectly through the use of proxy measurements or deconstructing into factors. Each specific study identifies factors that measure it by their conceptualisation, the most recognised indicator being the income earned by a family (Conger, Conger, & Martin, 2010; Department of Education, 2006; Harwell & LeBeau, 2010; Jefferson et al., 2011). Closely related to income is the dependency ratio (Dieltiens & Motala, 2014; Hall & Giese, 2009), which refers to the number of people who do not earn an income, dependent on those who do. The higher the dependency ratio the lower the SES, even for the same income.

Dependency not only considers the children, also known as the child-to-adult ratio (Komro, Flay, & Biglan, 2011), but also aged people who cannot earn an income, and the unemployed (Department of Education, 2006). The average unemployment rate in South Africa is about 25% (Spaull, 2013c), which will invariably affect the population's dependency ratio and thus SES.

The third most widespread factor in determining SES is the education level of a community, measured by the number of years of schooling (Spaull, 2013c) or the qualifications attained (Jefferson et al., 2011). These measures may be obtained despite poor quality education, whilst the literacy rate can also be measured as a proxy for education level (Jefferson et al., 2011; Raag et al., 2011). Large-scale assessment studies such as PIRLS, the Annual National Assessments (ANAs) and the SACMEQ study, use general achievement and reading literacy achievement, to make assumptions about the education quality and learning in the countries being studied.

Maternal education has been linked to both SES and achievement of learners in literacy and numeracy (O'Dea & Mugridge, 2012; van der Berg, 2008). Of significance is that paternal education has a less pronounced impact on learner achievement (van der Berg, 2008). Lower IQ scores have also been associated with low maternal education, which some authors (Al-Mekhlafi et al., 2011; Timæus, Simelane & Letsoalo, 2013) believe relates to decisions about when learners start school, whether or not they will matriculate, and even migration decisions such as moving to areas with better schools. Maternal education may however have more of an effect on the development of a child than it does on the SES of a community (Al-Mekhlafi et al., 2011; Jednoróg et al., 2012).

3.3.4.2 SES and education

SES has become prevalent in education discourse and has largely overtaken racial divisions as an explanation for differing levels of achievement within a population (Smith, 2011), with learners from low SES backgrounds achieving more poorly than others (Fergusson et al., 2008). In South Africa, a two-tiered system of education has emerged, with a "poorly resourced educational sector serving the

poor and mainly black population, while the wealthy have access to private and semiprivate public schools that serve mainly whites and the new black elite" (Badat & Sayed, 2014, p. 49). According to Heaton, Amoateng and Dufur (2014), blacks now face a "triple challenge of poverty, unemployment and inequality" (Heaton et al., 2014, p. 115). Although SES is widely believed to be associated with results in education, SES and race are still closely linked due to the racial differences perpetuated by history. This two-tiered system becomes evident when Quintiles one, two and three achieved noticeably lower results than Quintiles four and five in the Annual National Assessments (Badat & Sayed, 2014). For Simkins (2011), however, high-performing public schools and private schools are in one tier and under-performing public schools in the other.

Low SES has been associated with low attainment and achievement (Dada et al., 2009; Ngware, Oketch, Ezeh, Mutisya, & Ejakait, 2012; O'Carroll, 2011; Timæus et al., 2013), poorer health (Fergusson et al., 2008) and reduced brain capacity due to lack of nutrition (Al-Mekhlafi et al., 2011). There has also been a link between low SES and limited expectations from parents (Mizala & Torche, 2012; Strand, 2010), teachers (Mizala & Torche, 2012) and learners themselves (Strand, 2010). Believing that a lower SES will inevitably lead to low achievement may thus be realised.

Indicators of SES such as income, dependency and maternal education or literacy rates are considered predictors of achievement in education, also a "predictor of life opportunities, including economic, psychological, health and social spheres" (O'Dea & Mugridge, 2012, p. 975). That educational achievement can be regarded as a strong predictor of future quality of life, employment and lifestyle, means that learners with low SES have limited prospects for their future compared to those from higher SES backgrounds. However, lower SES is only one of the factors that determine achievement, another being to determine whether South Africa reaches its educational goals despite delays in funding. Boateng (2014) suggests that timeous distribution of resources will enable schools to achieve goals, as illustrated in the figure below.

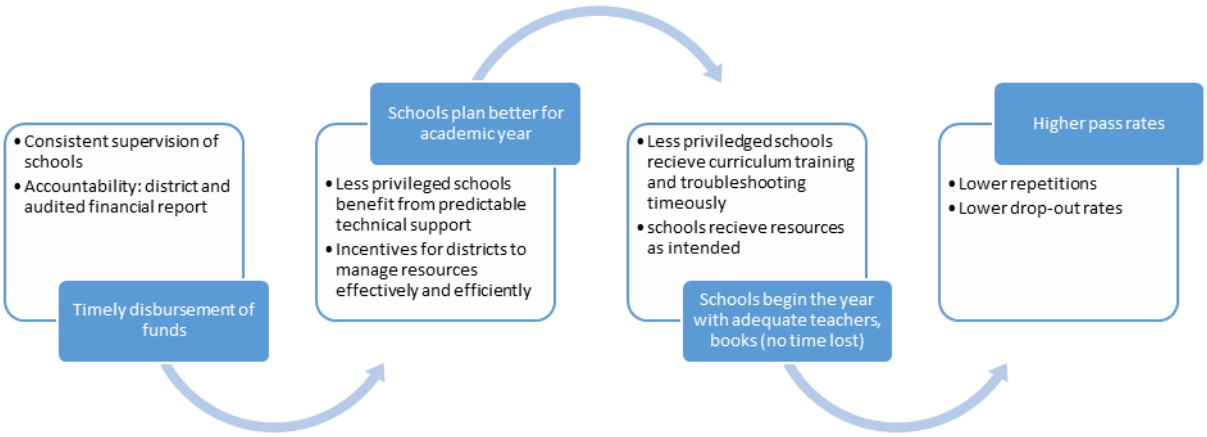


Figure 3.1: A model for illustrating the relationship between delays, accountability and education outcomes (Boateng, 2014)

Figure 3.1 suggests that management of educational resources may be as important as the education resources allocated to schools. The responsibility for school management lies at a number of levels, from the national departments to the SGBs, and all these stakeholders should be cognisant of their ability to affect achievement.

Raskin, Stewart and Haar (2012) have found that even outliers of ethnicity and/or SES may still achieve well but it is usually the result of determined principals and teachers or a positive school culture that has been developed. Modisaotsile (2012) states that even schools with limited resources may achieve well with good leadership for teachers and learners. These points reinforce the need for strong leadership in schools in South Africa (Badat & Sayed, 2014; Modisaotsile, 2012). However, due to the inequality of opportunities, strong leadership is not prevalent (Turnbull, 2013). Parental involvement, support and high expectations have also been known to positively relate to learners' achievement from all SES backgrounds. Even illiterate people can provide opportunities for their children through increased access to literacy-related activities (Dixon et al., 2008). The development of good, positive and strong educational leadership as well as leadership in the home might be the answer to transcending the SES trap of poor schools.

3.3.4.3 Disparity between rich and poor

The Gini co-efficient is a measure of national income equality[3] (Budlender & Woolard, 2012; Nilsson, 2010), according to which South Africa has a high level of inequality, that stretches further than the two-tiered education system (Graven, 2014). The table below shows the Gini-coefficient in 2005, 2007 and 2010 (Chisholm, 2012; van der Berg, 2011).

Table 3.1: South Africa's Gini Coefficient

Year	Gini co-efficient
2005	0.67
2007	0.7
2010	0.72

The trend indicates an increase in inequality as a higher Gini co-efficient often reflects high levels of poverty, however, Van der Berg (2011) argues that the connections between poverty and inequality are not direct, because even if there is economic growth, inequality will undermine the gains. Despite these warnings, the value of the Gini coefficient can be seen in the great concern about the gap that developed between the previously disadvantaged, usually poor, and the rich (Sayed & Motala, 2012a; Spaull, 2013b).

The disparities between groups are still reflected in the availability of schools' resources, numbers of teachers, size of classes and the areas in which schools are situated. The level of financial support for the schools is linked to the quality of

[3] This index is measured from 0, which indicates that a society is completely equal, to 1, showing the most extreme inequality.

education that they are able to provide. An example that highlights the differences between the more affluent schools and others would be their ablution facilities. Many rural or informal settlement schools and homes do not have functional toilets (Hall & Woolard, 2012), with learners expected to make use of pit toilets (Spaull, 2013c), which are unhygienic and dangerous, especially for young learners. These discrepancies of education quality reinforce the gap between rich and poor (Sayed & Motala, 2012a).

The consequences of ignoring the role of education in increasing the gap between people, as the emergent two-tier system suggests, may be dire as in the case of Rwanda (McLean Hilker, 2011). Leading up to the genocide in 1994, the education system played a negative role, sowing more discordance between the Hutus and Tutsis. The policies put into place in 1962 claimed "the reforms included universal education and equality of opportunity to support rural and community-based development" (McLean Hilker, 2011, p. 268), and the events favoured certain political, religious and ethnic groups. Education was thus instrumental in fostering hatred between the people, which culminated in horrific bloodshed.

In another case, education has been used to disadvantage Roma learners in European countries, by unjustifiably putting many into remedial schools or special classes (O'Nions, 2010). The Grand Chamber of the European Court of Human Rights has ruled that it was not in the best interests of the Roma learners and stated that the "school system in a pluralist society needs to be both integrative and intercultural" (O'Nions, 2010, p. 5). This case exemplifies the change that is happening in educational thought, to be used fairly to enhance prosperity for all.

3.3.5 Education as a tool for decreasing disparity

Education can be used as a tool for prosperity and a "vehicle for transforming society" (Graven, 2014, p. 1039), as social order and social systems can be engineered through it. Whilst education was used to enforce racial segregation under apartheid, with the use of policies such as Bantu education, so it can be used to engineer socially and economically cohesive policies that uphold redress,

quality and access (Badat & Sayed, 2014). Narrowing gaps between sectors of the population requires provision of similar opportunities for all learners to improve their lives for themselves, their families' and the country. Improving the education levels and the earning potential of the lower SES would enable more economic growth in the country, following the example of countries such as China.

While China does not have a glowing record on human rights, some of their attempts to relieve economic disparity deserve mention. China's economic growth has been unprecedented and the emphasis on good education for all has had a part to play in the economic growth (Garnaut, Fang, & Song, 2013). China has worked on narrowing the gap between the rural and urban schools by centralising schools (Mo et al., 2012). Single room/class schools in rural areas were shut down and the learners sent to village or country schools in urban areas, often away from their families. The goal was to improve the effective use of resources by centralising these and so improving education. By effectively using resources, more learners would have access to better quality education.

Another example of improved education and earning potential among low SES groups is South Korea, the trade of which had opened over the last 50 years (Doces, 2011) and the fertility rate has decreased as more people adopt careers at the expense of having many children (Doces, 2011; Lee & Mason, 2010). From 1950–2001, Korea's per capita income increased by 129 times (Ali, Ali, & Amin, 2013), attributed by General Secretary of the United Nations, Ban Ki Moon (2012) to education, as "a major driving force for human development"('UN Global Education First Initiative – United Nations Secretary General's Global Initiative on Education – An Initiative of the SG', 2012).

Education is one of the prerequisites of human development and not simply a result of human activity (Suri, Boozer, Ranis, & Stewart, 2011). This development then fosters economic growth, with education a "universally accessible road to success" (Raag et al., 2011, p. 691).

3.4. OVERVIEW OF ALTERNATIVE FUNDING SYSTEMS

The following section provides detail on how funding systems operate in developed and developing contexts, before presenting an overview of the South African system.

3.4.1 Developed countries

The United States of America (USA) is considered a developed country and prioritises education and literacy. The decentralised education system enables states to control the curriculum, funding and resource distribution, within the bounds set by the federal system (Mullis, Martin, Minnich, Drucker, & Ragon, 2012). In most states, the largest portion of the budget is directed towards education. Control is further decentralised, since some states put the task of funding and decision-making at a local level. Here, school boards are responsible for the functioning of a school (Mullis et al., 2012) and funding is mostly generated from local sources such as property tax (Carey & Roza, 2008). The majority of learners attend public schools, but other options include private, especially faith-based schools, home-schooling and charter schools, the latter publicly funded, but having obtained exemption from certain rules set by a local authority or the state. In general, The USA have prioritised access to education with the policies implemented for equal opportunities. These equal opportunities became a prerequisite for programmes seeking federal and government funding. The programme should especially provide opportunities for underprivileged learners in order to foster upliftment.

The No Child Left Behind (NCLB) Act was passed in 2001 and held schools receiving government funds accountable for the results that learners obtained under their tuition (Gonzalez-DeHass, Willems, & Holbein, 2005; Mullis et al., 2012). The motivation behind directing funds towards the NCLB policy was to help poor communities with access to quality education. This was achieved by allocating money according to the number of underprivileged learners that a school enrolled (Carey & Roza, 2008). Although all public schools are free, the amount of funding that similar schools in similar situations receive is different

(Carey & Roza, 2008), a disparity known to influence achievement and test scores. Carey & Roza (2008, p. 11) identify a “glaring flaw’ in the distribution of funds because the government “provide(s) more money to poor students in wealthy states than to poor students in poor states”, as local funding available to schools is also largely dependant on the SES of an area. This compounds differences in funding between schools.

England has a centralised education ministry, responsible for education across the country. There are three types of schools, namely, public, academies and free. The public school follows a curriculum set by the government and is funded by the government, whilst academies are private, often funded by entities such as universities, religious groups or businesses. These funding entities are considered ‘sponsors’ for the school. Free schools, on the other hand, are “non-profit, independent, publicly funded schools” (Mullis, Martin, Minnich, et al., 2011). The academies and free schools have more flexibility regarding the curriculum they follow, as long as the education they provide is well-balanced and covers a broad spectrum. One striking feature of the English education system is the ability to retain learners in the school system: “At the end of 2010, 84% of 16- to 18-year-olds were in education and training” (Mullis, Martin, Minnich et al., 2011), significantly higher than other developed countries.

3.4.2 Developing countries

The South American country of Colombia has a Ministry for National Education (MNE) which sets the competency standards for the country and is responsible for “policies and educational strategies, establishes standards, allocates resources for service delivery, and carries out inspection and supervision of the sector” (Mullis, Martin, Minnich et al., 2011). Local and municipal bodies are responsible for implementing the standards set by the MNE, as service delivery is thought to be most effective in decentralised systems. Individual schools are then allowed to create and implement their own curricula based on these competency standards (Mullis, Martin, Minnich et al., 2011). Public education is provided by the government and although private education does exist it functions with the permission of the government. A Concession School Programme was launched in

2000 (*The Missing Sector: Contract Schools: International experience and South African*, 2013), involving 16 low-cost schools in low SES areas, which were government-funded but privately managed. These schools enjoyed a significant amount of autonomy and produced good results. The drop-out rate was low and the way money was spent was more efficient (*The Missing Sector: Contract Schools: International experience and South African*, 2013).

Botswana, in Southern Africa, has made an effort to prioritise literacy in English and Setswana with literacy programmes implemented in the first school year and awareness encouraged through celebrating International Literacy Day (Mullis, Martin, Minnich, et al., 2011). There has also been an increase in early literacy programmes but these are predominantly private and relatively expensive (Mullis, Martin, Minnich, et al., 2011). Initiatives are being implemented to standardise existing preprimary education and to increase public access to preprimary education for all learners (Botswana, n.d.): “Botswana provides a ten-year basic education which is not statutorily compulsory” (Mullis, Martin, Minnich, et al., 2011). Only about 8% of schools in Botswana are privately owned whilst primary education is free and subsequent education does receive a small amount of funding from school fees. The government provides funding for most education and the Ministry of Education and Skills Development (MoESD) and the Ministry of Local Government are jointly responsible for providing primary education (*Botswana*, 2010; Mullis, Martin, Minnich, et al., 2011). Whereas the local government is responsible for school infrastructure in the districts, the MoESD sets the curriculum and takes care of the staffing of schools (Mullis, Martin, Minnich, et al., 2011). By having two departments involved in education, the system has become decentralised (*Botswana*, 2010).

3.5. THE QUINTILE FUNDING SYSTEM IN SOUTH AFRICA

The Quintile system in South Africa was adopted in 2007, with all education funding coming from the National Treasury. Section 34 of the South African Schools Act explains that “the state is mandated to fund public schools from public revenue on an equitable basis in order to ensure proper exercise of the rights of

learners to education and redress of past inequalities in educational provision" (Department of Education, 1998, p. 4). This funding is allocated to the DBE and the provincial treasuries which in turn distribute funding to the PEDs. This flow of funding is shown in the figure below, detailing where schools obtain their funding in 2009.

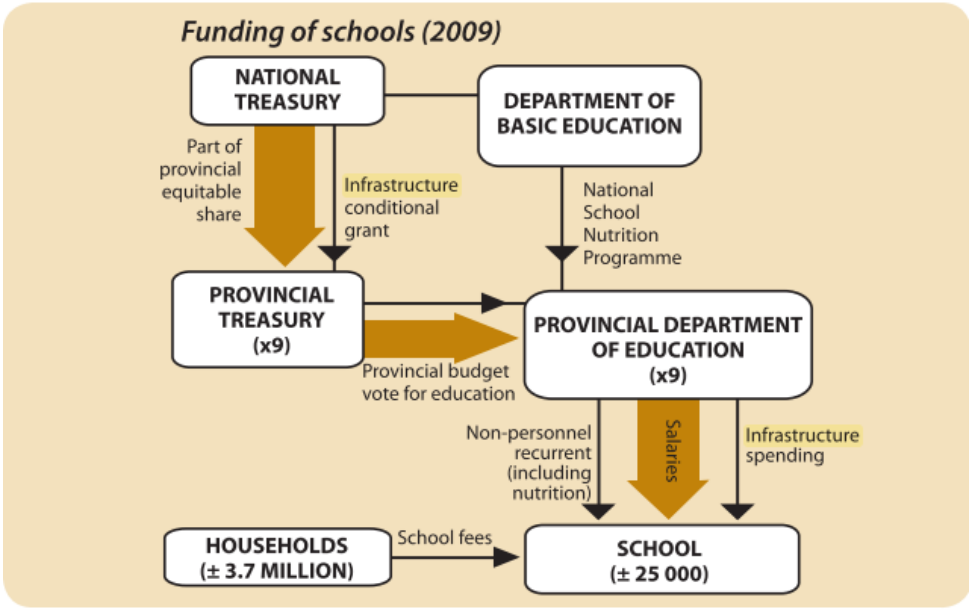


Figure 3.2: Funding of schools in 2009 (Department of Basic Education, 2011a)

Not all public schools in the country receive the same funding but rather the Quintile system is used, based on their poverty score. The system divides schools in the country into five categories. Quintile one includes the neediest schools, in low SES areas, whilst Quintile five includes the most affluent schools with the highest SES. This system clearly aims at equity rather than equality and in so doing attempts to reduce the disparities created by the previous system. The provision of more funds to needier learners should provide them with a better education and afford them opportunities they would otherwise not have obtained.

3.5.1 Conceptualisation of the Quintile system

Despite mounting international pressure to provide free education for all, the South African education system still faces exorbitant costs and the need to keep the middle class from moving to private schools in efforts to seek higher standards of education (Fiske & Ladd, 2004a). Though there are schools which are encouraged to charge fees and the SGB is encouraged to fundraise, all public schools receive some money from the government. The pro-poor spending policies of the DoE were clear in the original distribution of funds, ensuring that the neediest learners received the most money. The original formula for distributing funds (Department of Education, 2006; Dieltiens & Motala, 2014) had learners in Quintile 1 receiving 30% of available funds. As the Quintile increased, the percentage of funding decreased with Quintile 5 receiving only 5% of available funds. The distribution of funds has however changed since 2007, as shown in the table below.

Table 3.2: Allocation of funds for the 5 Quintiles in 2007 and 2014

	Original division (2007) (%)	Current division (2014) (%)	Difference
Quintile 1	30	27.2	-2.8%
Quintile 2	27.5	27.2	-0.3%
Quintile 3	22.5	27.2	4.5%
Quintile 4	15	13.8	-1.2%
Quintile 5	5	4.6	-0.4%
Total	100	100	

The original division illustrates that the most funds were received by the poorest learners through the allocation of Quintile 1. This percentage of funds decreased as the Quintile rank increased.

Previously, 40% of schools (roughly Quintile 1 and 2) were deemed 'non-Section 21 schools', which meant that they were not allowed to obtain their own funds and had to do so through the DoE (Boateng, 2014), effectively making them no-fee schools. The current division however shows that Quintile 1, 2 and 3 schools are all receiving the same percentage of funds. All Quintile 1, 2 and 3 schools have been declared no-fee schools as of 2014 (Dieltiens & Motala, 2014; Naong, 2013; Sayed & Motala, 2012a). The schools in these Quintiles make up 60% of the schools in the country with 81% of the non-personnel funds being spent on these learners. Although the policies are said to be pro-poor, Table 3.2 shows that the Quintile 3 schools seemed to have benefitted the most from this change in distribution, with an increase of 4.5% in allocation of funds.

Such a distinct change in the formulae for calculating the distribution of funds has led to questions about the motivations for the change in distribution. Speculation about the original incorrect allocations of schools to Quintiles may account for very needy schools being present in Quintiles 2 and 3, instead of just Quintile 1. The incorrect allocation of Quintiles could account for similar poverty profiles across these three Quintiles and to compensate for this similarity these Quintiles are receiving the same funds. Spaull (2013) shows that the achievement of the poorest 75% of South African learners is similar and lower than the wealthiest 25% who scored much higher in the SAQMEQ III study (Spaull, 2013b). This achievement emphasises similar achievement in the lower Quintiles, lending weight to the argument for few differences across the lower Quintiles.

3.5.1.1 Provincial distribution of funds

South Africa is divided into nine provinces with large differences in their demographics. At the outset of the new system, provinces were each made responsible for classifying the schools but this has now changed to a national responsibility after inequalities arose which "exacerbated rather than reduced educational inequity across provinces" (Badat & Sayed, 2014). Currently, the Quintile distribution is different in each province, to reflect the need or wealth in each, most accurately. The table below, which was included in the Government

Gazette (Department of Basic Education, 2014) in 2014, shows the provincial distribution by Quintile.

Table 3.3: National Poverty Distribution Table (Department of Basic Education, 2014)

Province	Quintile					Total
	1 poorest	2	3	4	5 most affluent	
Eastern Cape	27.3	24.7	19.6	17	11.4	100%
Free State	20.5	20.9	22.4	20.8	15.4	100%
Gauteng	14.1	14.7	17.9	21.9	31.4	100%
KwaZulu-Natal	22.1	23.2	20.2	18.7	15.8	100%
Limpopo	28.2	24.6	24.2	14.9	8	100%
Mpumalanga	23.1	24.1	21.5	17.7	13.5	100%
Northern Cape	21.5	19.3	20.7	21.4	17.1	100%
North West Province	25.6	22.3	20.8	17.6	13.7	100%
Western Cape	8.6	13.3	18.4	28	31.7	100%
South Africa	20	20	20	20	20	100%

Limpopo, the northern-most province, has the highest percentage of Quintile 1 schools (28,2 % of the province's schools) and the lowest percentage of Quintile 5 schools (8% of the province's schools) (Department of Basic Education, 2014). This percentage shows that a large proportion of schools in Limpopo are from low SES areas, which implies a combination of low income, high unemployment and

lower education levels for this province. At the other extreme, the Western Cape only has 8,6% of its schools in Quintile 1 and 31,7% in Quintile 5, showing that more schools are in high SES areas with higher income, lower unemployment and higher education levels than other provinces. These percentages help to highlight gross inequalities within the education system across provinces and that the Quintile allocation appears different for each province, depending on its SES profile.

3.5.1.2 Spending Per Learner in 2007 and 2014

The table below shows differences in spending per learner in each Quintile in 2007 (Department of Education, 2006) and in 2014 (Department of Basic Education, 2014).

Table 3.4: The financial allocation per Quintile in 2007 and 2014

	2007 financial allocation (in Rands)	2014 financial allocation (in Rands)	Increased by: (in Rands)
Quintile 1	738	1059	321
Quintile 2	677	1059	382
Quintile 3	554	1059	505
Quintile 4	369	530	161
Quintile 5	123	180	57

The funding per learner has increased across the Quintiles from 2007 to 2014, which is expected to account for inflation. Tables 3.2 and 3.4 both show that the distribution of funds has also changed significantly with learners in Quintiles 1, 2 and 3 receiving the same amount of funds in 2014. Again, the Quintile 3 learner would be benefitting the most from the changes in distribution since the amount the school receives per learner had almost doubled over the previous seven

years. Quintiles 1 and 2 schools received R321 and R382 more in 2014 than 2007, respectively. These amounts allocated to Quintiles 1, 2 and 3 schools are substantially more than the Quintiles 4 and 5 schools which only received R161 and R57 more than 2007, respectively.

3.5.2 Challenges

The Quintile system has faced a number of challenges, with Dieltiens and Motala (2014) arguing that the allocation of Quintiles is inconsistent with the needs reflected in communities. In the discussion concerning the conceptualisation of SES, multiple indicators could be used to describe SES completely. If only one or two indicators are used, as Badat and Sayed (2014) suspect, then perhaps the inconsistencies could be due to the Quintile system's measure of SES not being sufficiently robust. An incorrect measure of SES could render the whole system ineffective since the Quintile system is based on measuring the need of learners through the SES of the area and catering for these needs. The poverty score, roughly the SES, was arrived at by considering income, dependency ratio and level of education (Dieltiens & Motala, 2014). These three indicators are provided by Statistics South Africa and schools that feel their Quintile was unjustified are able to apply for it to be reviewed. This review is conducted annually by the provincial departments (Dieltiens & Motala, 2014) but anecdotal evidence suggests that the changing of a Quintile is rare. There have also been questions about the accuracy of the data used to place schools in Quintiles, with some reports showing that statistics from the 2001 Census were used to allocate schools to Quintiles in 2007 (OECD, 2008). These complaints surfaced when two schools in the same area, i.e. those with the same area SES, were placed in different Quintiles (Dieltiens & Motala, 2014).

Another concern is that areas rather than individual households are used as the unit of measurement to save time and money. This approach has been found to restrict the accuracy of the results, which means that individuals who are above or below the average SES of that area will not 'fit' into the Quintile of the school of that area. Learners coming from other areas or who travel to schools may also face a similar problem and many families have migrated to areas with better

schools in order to provide their children with greater opportunities. Migration between schools has become popular (Dieltiens & Motala, 2014; Motala, 2008), especially in Gauteng (Sayed & Motala, 2012a), such that the Quintile of a school no longer reflects the SES of the area. Because of this migration, disadvantaged learners may be receiving less funding than they should because they have chosen to attend a higher Quintile school which may be situated in a more affluent area. Migration also distorts the allocation of funds from year to year, since the allocation for the following year is determined by the number of learners in the current year (Dieltiens & Motala, 2014). Therefore, insufficient funding may have been allocated to a school because the number of learners in the school has changed from the previous year.

The SES of a school was originally determined by the provincial departments according, inter alia, to facilities available and the relative poverty of an area. (Dieltiens & Motala, 2014). This allocation system was problematic due to the differences in measurement of the indicators of SES and it was found that "learners from poor socioeconomic backgrounds were victims of regional disparities" (Dieltiens & Motala, 2014) because poorer provinces spent less on education. Another concern was that schools that had good infrastructure, such as sports fields and buildings, could not necessarily afford the upkeep (Dieltiens & Motala, 2014). This challenge was overcome by placing the responsibility of Quintile allocation in the hands of the national department so the division of funding by province was made. The concept of a decentralised educational department is, however, undermined by the centralisation of the funding made available.

Badat and Sayed (2014) argue that spreading funds in order to accomplish multiple goals in education means there is a limited amount available for each goal. This strategy has compromised the attainment of these goals and there is a need for more money to be directed towards education in order to improve learner achievement. Modisaotsile (2012) claims there is still a "shortage of resources in education despite the large budgetary commitments by government" (Modisaotsile, 2012) with South Africa spending 18,5% of its annual budget on education. Education is the "highest item of budgetary expenditure" in South Africa

(Chisholm, 2012) with 5.5% of the Gross Domestic Product (GDP) spent on education (Boateng, 2014).

The large amount of funds allocated to education has not, however, translated into higher achievement for South African learners in PIRLS 2011, with Morocco achieving higher than South Africa and Botswana having similar scores to South Africa in prePIRLS 2011. Chisholm (2012) points to issues of underspending and mismanagement of funds as some of the reasons for the continued inequality in education. That many other African countries, with far fewer resources also consistently out-perform South Africa in large-scale testing, "indicating that our poor performance cannot only be attributed to our levels of poverty" (Graven, 2014). The argument has been made by Boateng (2014) that even though the structure of the national education department is sound, the district offices have "significant human resource constraints" (Boateng, 2014). Often, financial resources made available by the government, are leaked and lost because of a lack of checks and balances, which in turn means that the neediest learners do not receive the resources, such as infrastructure and teachers, promised to them (Boateng, 2014).

The figure below shows the effects of misappropriation of funds (Boateng, 2014), though not exhaustive since many of the other goals of education are also affected, such as limited access, so there is a reduced capacity to redress past injustices.

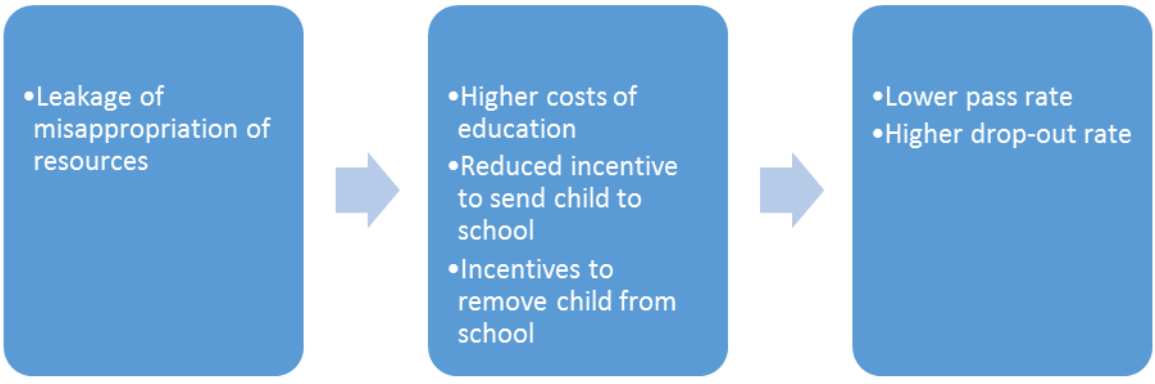


Figure 3.3: A model for illustrating the relationship between leakage and education outcomes (Boateng, 2014)

The figure illustrates a point of concern regarding the management of resources, often made available are not used effectively because of limited technical knowledge and poor financial record keeping (Boateng, 2014). The effective use of resources and funds is more of a determining factor than the amount of money spent on education. Increased spending is thus not the answer to the problem of an ineffective education system.

Graven (2014) believes that even though there was political will and a strong demand for change, these goals for the education system have not been realised. As stated above, the most worrying shortfall is that of quality education, difficult to measure directly so large scale international testing such as PIRLS can be used as an indication of performance within the system. The test scores of learners indicate how well they fare in comparison to those in other countries, and the extent to which curricular intentions have been implemented and can be evidenced by learner performance. The assumption then is that the higher the quality of the education system the better learners in that country will perform.

3.6. CONCEPTUAL FRAMEWORK

The following theories contributed to the conceptual framework of the study.

3.6.1 Bronfenbrenner's Systems Theory

Systems are made up of individual entities but also include the relationship and interactions between these (Hay, 2005; Holley, 2009). A system is thus not only a sum of individuals (Ryan, 2006), and as a generic system is made up of more than individual entities so too is the education system made up of learners, teachers, schools and national departments. Analysing the education system according to systems theory allows the researcher to examine individual entities as well as their role and impact on the other entities and the system as a whole.

The conceptual framework used for this study is Bronfenbrenner's bio-ecological systems theory, which attempts to explain the development of a child (Lewthwaite,

2011) based on the systems of which he or she is part. The child's development is associated with innate traits and predispositions as well as interactions with surroundings, both human and inanimate (Bronfenbrenner & Morris, 1998). The purpose of the bio-ecological systems theory is to "provid(e) scientific bases for the design of effective social policies and programs that counteract newly emerging developmentally disruptive influences" (Bronfenbrenner & Morris, 1998). Education policy falls within social development policy in a country.

Bronfenbrenner added to general systems theory by arguing that the systems at play regarding child development are nested based on their proximity, timespan, recurrence and importance (Bronfenbrenner & Morris, 1998; Lewthwaite, 2011). The child is situated within the family, or microsystem, with the family having regular face-to-face contact with the child over a long time. The family is then nested in the community or mesosystem, which is made up of entities which have regular meaningful contact with the child but not to the extent of the microsystem. These include schools and churches. The exosystem relates to the child's environment but is not in direct or regular contact with him or her. The macrosystem encompasses all these previously mentioned systems and is usually at a national or international level, whether law, policy or culture influence, albeit at a distance.

Bronfenbrenner's bio-ecological system underwent constant development throughout his lifetime (Tudge, Mokrova, Hatfield, & Karnik, 2009), with the early model containing only the microsystem, mesosystem, exosystem and macrosystem, which essentially focussed on the context of a child's development. Later Bronfenbrenner acknowledged the role that the individual plays in his or her own development (Tudge et al., 2009). The most complete and recent theory is the "dynamic interrelationship" (Brofenbrenner, 1999) of the PPCT concepts (Brofenbrenner, 1999; Tudge et al., 2009), the concepts being the process, person, context and time. The acknowledgement of the interplay of these four concepts, highlighted the move away from overemphasis on context (Darling, 2007).

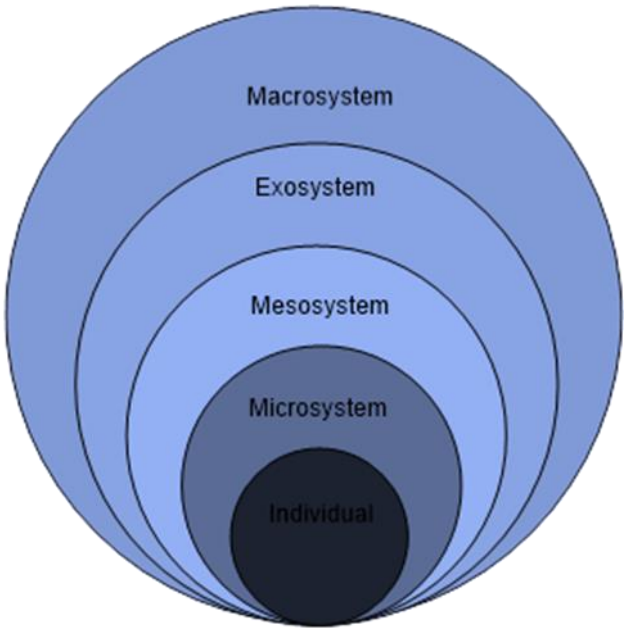


Figure 3.4: Bronfenbrenner's bio-ecological model (Lewthwaite, 2011)

The figure above shows this nested system, the largest being the macrosystem, which in this study includes the national aspects of the education system. The exosystem, contained in the macrosystem, encompasses the environmental factors that do not directly affect a child's development. Nested therein, the mesosystem comprises schools and churches or other systems within which a child functions often but not as often as the child's own family. The child's own family and home would be considered at the microlevel, since they have direct contact with a child for a prolonged time. Within all of these contexts, is the child, who him/herself has certain innate abilities and genetic predispositions, but whose development is still heavily influenced by the context within which he or she exists.

3.6.2 The PIRLS Assessment Framework

PrePIRLS 2011 makes use of the systems framework used by the PIRLS study and a considerable overlap between the tenets of Bronfenbrenners' work and that of the prePIRLS 2011 framework exist. In the figure below, the arrows indicate the relationships between the components, because of which any changes made to

any components impact on the other components as well as the system as a whole.

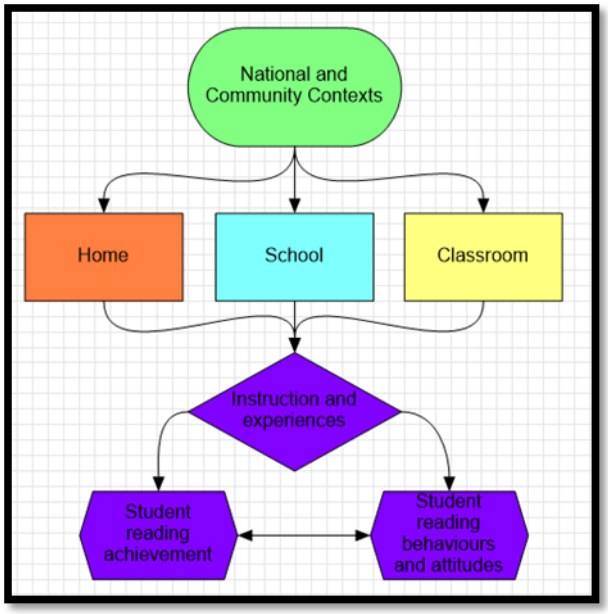


Figure 3.5: PIRLS Framework for assessment (Mullis, Martin, Kennedy et al., 2011)

Similarities can be found between the prePIRLS 2011 framework and Bronfenbrenner's systems theory with both referring to components on different levels that are all associated with the development of the learner, in this case the development of reading literacy within nested contexts of the home, school and community, both locally and nationally. The figure below shows a combined framework, drawing on Bronfenbrenner's nested model and the prePIRLS 2011 assessment framework.

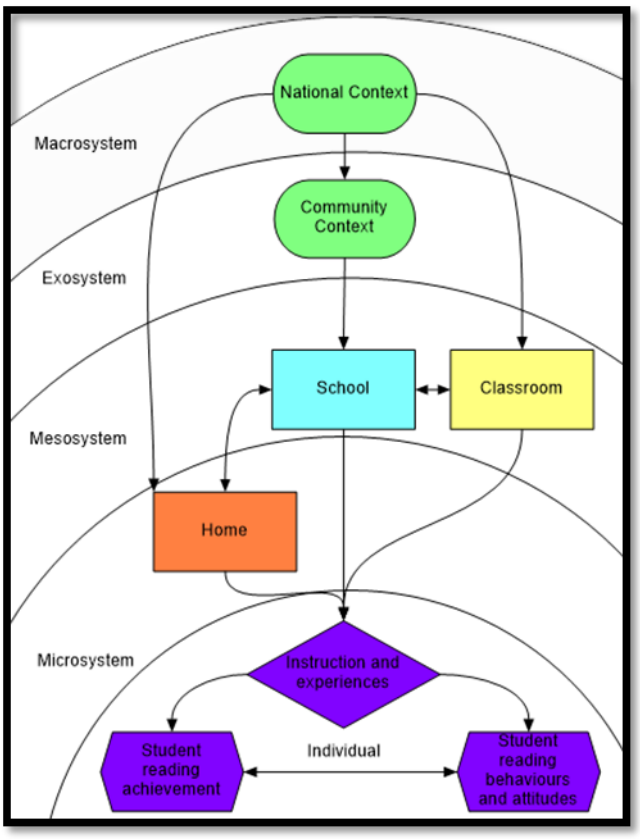


Figure 3.6: A nested prePIRLS 2011 Framework integrated with Bronfenbrenner's Bio-ecological Model

Figure 3.6 shows the framework used in this study, was arrived at by combining Bronfenbrenner's bio-ecological model with the prePIRLS 2011 Framework. The combined framework was then used to classify the questions from the prePIRLS 2011 background questionnaires into the Bronfenbrenner levels then into individual, family, classroom, school, and community categories.

Appendix A, B C and D illustrates how items, as taken from the prePIRLS 2011 contextual questionnaires, correspond to each of the levels as described by Figure 3.6.

3.6.2.1 Macrosystem

All schools in this study operate within the same national context, with the same national education policies and curriculum. Because this study focusses on schools within the same South African national context, the national context is not measured.

3.6.2.2 Exosystem

In the exosystem, the SES of the community is gauged by looking at indicators such as:

- the number of learners who come from disadvantaged and affluent homes and the average income bracket into which these families would fall.
- the number of learners who come to school hungry and benefit from the school's feeding scheme.
- the income of the area, which is linked to the available resources, though these resources are not limited to the physical.
- the availability of human resources is also considered in the form of teacher aides, language professionals and speech therapists.
- the parental involvement expected from and received by the school, is also an indicator of human resources available.
- the classification of the area, in terms of population density, urban, rural, and township, also helps to gauge the situation of the community within which the school exists.

3.6.2.3 Mesosystem

The mesosystem falls within the macro- and exosystems and for the purpose of this study, two sub-classifications have been identified, namely the school and classroom. The data from the principal, teacher and parent questionnaire was used to further identify indicators within each sub-category.

At the school level, the SES can be gauged by examining indicators such as:

- The economic resources, which are measured by questions that deal with physical resources available at schools, including computers, science laboratories and reading books.
- The needs of the school, which are measured through questions asking how teaching and learning is impeded through the lack of certain resources such as buildings in disrepair, limited space due to overcrowding and the lack of teaching resources such as textbooks.
- The human resources at the meso school level, which are measured using indicators such as the numbers of teachers employed at the school and

their training and readiness. Once again, the participation of the parents is also determined at this level.

- The number of learners needing and receiving remedial help, which is measured to determine the human resources available to cope with the challenge of remediation.

At the classroom level, the SES can be gauged by exploring indicators such as:

- The number of learners in the class, which informs the situation of the community since the larger the ratio of teachers to students in a class the more challenging it is to effectively teach.
- The availability and access to resources, such as books, magazines and computers, also inform the SES.
  Challenges faced by the learners, such as the numbers who come to school suffering from hunger or lack of sleep.
- The provision of advanced readers with advanced reading material or literacy exercises is also measured.

At the micro level, the indicators of SES identified are concerned with the individual's access to the resources found in the home and at school in shaping their instruction and experiences. While the prePIRLS 2011 assessment does make reference to reading behaviours and attitudes these do not form part of the current analyses. In this study, learner reading achievement will be measured by the prePIRLS 2011 reading literacy achievement scores.

3.6.2.4 Microsystem

Heaton states that "the family institution is central in understanding racial inequalities in educational outcomes in South Africa" (Heaton et al., 2014), so this family institution should be examined. Once again, the availability and access to resources are an important indicator of SES at the micro home level, to be measured using indicators such as:

- the availability of resources, which is heavily influenced by the income earned by parents. It is largely determined by the jobs of the parents and their level of education. There are many resources at the home level which

can help to determine the SES of a family, such as availability and access to electricity, books and computers.

- Whether or not a child attended a pre-school, the type and the duration of the preschool attendance. These measurements do not directly assess SES but may be used as a proxy. Parents from higher SES groups tend to send their children to pre-school of high educational quality for more than one year because they can afford to do so.
- Parental involvement in schools.

3.6.2.5 The Individual

Finally, within the micro level, the indicators of SES identified are concerned with the individual's access to the resources found in the home and at school. Although resources may be available, how they are used is strongly associated with reading literacy achievement. By examining how resources are used by learners, insight into reading behaviours and attitudes is gained, but this is not the aim of the current study. The mere presence of resources at the individual level is used as a gauge of SES.

3.7. CONCLUSION

This Chapter began by discussing definitions of reading literacy and the importance of adequate levels of reading literacy for society. An explanation of the national educational context within which this study takes place was then provided. This explanation highlights the goals that the South African government sought in and through education as well as a reflection of the accomplishments made towards these goals. In order to achieve the educational goals in South Africa, the most appropriate funding system must be chosen. The funding systems for two developed countries, the USA and UK, and for two developing countries, Botswana and Columbia, were then briefly explained. The Quintile funding system as used in South Africa was then explained in detail. The explanation included motivations for the system and how it was conceptualised, the breakdown of the percentages of schools in each of the provinces as well as the levels of funding available to the different Quintiles. The evolution of the system and the challenges

which have arisen were also discussed in an attempt to assess the appropriateness of the Quintile funding system for South Africa.

Finally, the conceptual framework for this study was discussed. The conceptual framework combines the bioecological model conceptualised by Bronfenbrenner, with the prePIRLS 2011 assessment framework. By using the bioecological model, the development of a child can be explained within their social contexts or nests. By superimposing the prePIRLS 2011 assessment framework onto the bioecological model, it can be seen that the components that make up the assessment framework, can be classified into the macro, meso and micro levels that Bronfenbrenner identified. This conceptual framework will inform the data analysis in this study, as discussed in Chapter 5.

CHAPTER 4: RESEARCH DESIGN AND METHODS

4.1. INTRODUCTION

The purpose of this study is to gauge the suitability of the Quintile system for the non-personnel funding of education in South Africa, to be achieved through examining the SES profiles and reading achievement of each of the five Quintiles. Since reading achievement is used as a proxy for judging the quality of education, the statistical differences between the reading achievement as obtained by Grade 4 learners across the five Quintiles will be examined.

4.2. RESEARCH DESIGN

This section describes the research design. The post-positivist paradigm informed this study and a quantitative approach was adopted. PrePIRLS 2011 data was used to conduct this secondary analysis. Following the research design, the methods for the study are explained in detail. These discussions include how the sample was chosen, the instruments used in data collection, data collection and analysis, as well as the methodological norms and research ethics.

4.2.1 Post-positivism

This study is informed by the post-positivist paradigm, which is rooted in positivism and realism but acknowledges shortcomings of these views and “allows for limitations, contextual factors, and use of multiple theories within which research findings are interpreted” (McMillan & Schumacher, 2014). Post-positivists are also considered critical realists due to the assumption of the existence of an objective reality (Ryan, 2006), but believe that “knowledge is created socially, and our knowledge of reality is a result of social conditioning” (Goduka, 2012, p. 6). That knowledge is socially created implies that this form of positivism is not only used for studies in the pure sciences but can also be applicable to the social sciences (Mertens, 2010; Ryan, 2006).

The objective reality that post-positivists believe exists is sought but not necessarily attainable. Researchers cannot know if the objective reality has been achieved with any certainty (Goduka, 2012; Mertens, 2010). The objective reality is researched through empiricism (Racher & Robinson, 2002), similar to the scientific method. Post-positivism has been associated with the generation of knowledge as well as research which has a revolutionary role in inspiring social change (Ryan, 2006).

For the purposes of this study, post-positivism is appropriate since the research is located in the social sciences while still approaching research in a quantitatively rigorous way, in order to describe and better understand the South African Quintile funding system. This approach effectively combines the strength of numeric data while still acknowledging the social environment from which it was taken. The PIRLS assessment framework made use of numeric data collection by means of the reading literacy achievement test. The social environment was then discovered through the background questionnaires answered by the learners, parents, teachers and school principals. As with the rest of the study, post-positivism informs the methodology, that is, the “mode of inquiry” (Maree et al., 2007) and corresponds to the ontology and epistemology, while leading the design of the research and data gathering methods. According to Mertens (2010, p. 15), “(a)lthough qualitative methods can be used within the paradigm, quantitative methods tend to be predominant in postpositivist research” and so a quantitative research design has been selected for this study.

The data from both the reading literacy tests and the background questionnaires was used for the purposes of describing the quintiles in terms of SES indicators in this study. Whereas the first sub-question, concerning building the SES descriptions, draws on both the reading literacy test and questionnaire data, the second, regarding statistical differences in reading achievement between the Quintiles, only draws on the reading literacy test results. The potential contribution that this study can make would be to provide evidence for revising and improving the Quintile system if it were found to be deficient and in need of revision.

4.2.2 Quantitative research

Quantitative research involves the conversion of processes, observations and qualities into numbers and symbols, "... joined with a grammar - typically a set of logical rules from mathematics or statistics - to form an inferential language" (Lupia & Alter, 2013, p. 54). This language can then be used to assess relationships between variables as numerical data, which is one of the essential elements of quantitative research. The other defining elements of this kind of research are generalisability and objectivity (Maree et al., 2007).

A benefit of using quantitative research is firstly the ability to score and compare the reading literacy test score. The prePIRLS 2011 reading literacy test score is given as a PV with the international centre point at 500 (Howie et al., 2012). Scores are therefore expressed on a scale from 0 – 1000, relative to the median of 500 (Howie et al., 2012). The results of the reading literacy test are comparable across international boundaries, which is useful for national policymakers when considering changes in their education systems. Secondly, it also makes it possible to collect and use data from many more participants than qualitative research allows for. Through the use of questionnaires, comprehensive background information can be collected more quickly than with interviews. The results of the background data were obtained using questionnaires, and a Likert scale, dichotomous questions and multiple choice questions were especially prevalent. Another strength of quantitative research and questionnaires is that participants from many language groups can be reached, notably since the prePIRLS 2011 questionnaires were made available in all 11 official South African languages to Grade 4 learners and their parents.

One of the possible draw backs of such large scale quantitative research in this case is the limited time participants have to complete the questionnaire. Although the teachers, principals and learners were allocated time to complete the questionnaires, the parents were expected to return them the following day. The questionnaire also assumed all participants were literate, or at least had access to a literate person who could help them complete it.

4.2.3 Secondary analysis

A secondary analysis is the “re-analysis of data for the purpose of… answering new questions with old data” (Glass, 1976, p. 3) or the “re-use of pre-existing research data” (Heaton, 2008, p. 34) to answer a research question. This study made use of the existing prePIRLS 2011 dataset for Grade 4 South African learners, to answer a question different from the one the original study intended. It explored the Quintile system through the SES indicators identified (see Appendix A – D), as well as the reading literacy achievement results. The data thus consisted of the test scores that learners achieved from the prePIRLS 2011 reading literacy test as well as data collected from the background questionnaires completed by learners, parents, teachers and principals.

The advantage of using secondary data was firstly that it had already been collected, coded and converted to an electronic format. This saved time and considerable cost, without compromising on the breadth and depth of the current study. The large sample used in the prePIRLS 2011 data collection allowed generalisable conclusions to be drawn about the population of Grade 4 learners in South Africa. On the other hand, one of the challenges of using secondary data was that this study was confined to the research phenomenon about which the prePIRLS 2011 study had collected data. Using secondary data also meant that follow-up questions could not be posed to any respondents. Since the scope of the study fell well within the delineated scope of the prePIRLS 2011 study, appropriate data was available. Another disadvantage of the secondary data analysis method was the lack of control the researcher had of the quality of the data. However the IEA had conducted many quality control steps (detailed in Chapter 2), the quality of the primary data collected was of a high standard and did not pose a threat to this study.

4.3. RESEARCH METHODS

The main research question was: what are the implications of the evidence from prePIRLS 2011 for the use of a Quintile system? The main research question will be answered by first answering the three sub-questions of the study, which are:

1) How can the Quintiles be described based on the SES indicators from prePIRLS 2011?
2) What are the statistically significant differences in reading achievement between the Quintiles?
3) Given the differentiation in achievement, to what extent is the Quintile system justified, in reducing inequalities along SES lines?

The following section describes the sample used for the current study, followed by a discussion about the instruments used in data collection as well as the process to be followed for data analysis, in order to answer the individual sub-questions. Methodological norms and research ethics of the study will also be explained.

4.3.1 Sample

This study makes use of the entire prePIRLS sample[4] of Grade 4 learners in South Africa. Table 4.1 (below) shows the size of the population and the sample taken from it for both the school and populations in prePIRLS 2011 South Africa.

Table 4.1: The population and sample sizes for South Africa (Joncas, 2011)

	Number of Schools	Number of Learners
Population	15,339	962,209
perPIRLS 2011 Sample	341	15,744

PrePIRLS 2011 therefore has a sample size of 15,744 learners from 341 South African schools (Howie et al., 2012; Joncas, 2011) across all nine provinces and was stratified by language, due to the multiplicity of official languages (Howie et

[4] The way in which the sample was drawn for prePIRLS 2011 is detailed in Chapter 2

al., 2012). All data collected from the sample of 341 schools and 15,744 learners were thus used in this secondary analysis.

Within the sample all five Quintile divisions of South Africa were represented. The table below shows the number of learners from each Quintile.

Table 4.2: Number of learners sampled in each Quintile

Quintile	N
1	3,085
2	3,587
3	4,151
4	2,564
5	1,474
Total	14,861[5]

4.3.2 General Methods

The following methods were employed in analysis the prePIRLS 2011 achievement and background questionnaire data to answer the research questions of the current study.

4.3.2.1 Instruments

The data in prePIRLS 2011 was collected using a multimethod approach, i.e., through a reading literacy test and background questionnaires. This is often used in postpositivist research because it allows for the study of a phenomenon in a quantitative way while still taking note of contextual factors. In this case, the phenomenon is reading literacy achievement and the contextual factors are the

[5] Some cases were removed due to too much missing information that would yield the data unreliable. There were also private schools (not funded by the government) that were part of the prePIRLS 2011 sample but do not form part of the sample for this study.

data collected from the questionnaires, more specifically the items that are indicative of SES.

4.3.2.2 Data collection and preparation

As stated above, no additional data was collected beyond the available prePIRLS 2011 South Africa data. The benefits of accessing this data source lay in the magnitude of data available, the limited cost with which to conduct the secondary data study and its having been cleaned and standardised. This data has also been proven reliable and valid, such that provided this study is reliable and valid the conclusions drawn should be accurate. A detailed discussion of prePIRLS 2011 study can be found in Chapter 2.

4.3.2.3 Data analysis

The data analysis methods were chosen so as to answer the research questions. Firstly, the descriptive descriptions concerning SES were built by conducting a descriptive statistical analysis using the International Database Analyser (IDB Analyser), especially developed by the IEA to use large-scale international data with the correct weighting (‘Data from IEA Studies’, 2011). IDB Analyser “creates SPSS code that can be used with SPSS to conduct statistical analyses, taking into account the complex sample structure of the databases” (‘Data from IEA Studies’, 2011). SPSS was originally the Statistical Package for the Social Sciences but is used more broadly than social sciences. It is with both IDB Analyser and SPSS that the analysis of data was conducted for purposes of the current study.

The following sections provide a detailed description of the instruments, data preparation, methods and data analysis techniques used for each of the sub-questions in this study.

4.3.3 Sub-question 1

Sub-question 1 of this study asks what the SES description for each of the Quintiles is, based on evidence from prePIRLS 2011.

4.3.3.1 Instruments

In order to build descriptions regarding SES for each of the five Quintiles, the context of learners is explored using the survey data collected from the learner, parent, teacher and principal questionnaires. Since SES is a theoretical construct the concept first needed to be operationalised into variables so as to make it measureable (Kimberlin & Winterstein, 2008). Because this is a secondary study of the prePIRLS 2011 data, only the questionnaire items that provided information about SES was used. This data is identified by using definitions of SES to select the prePIRLS questionnaire items that speak to the SES construct. The data was also classified according to the conceptual framework, using Bronfenbrenner's bioecological model and the PIRLS assessment framework. These SES-related items are shown in the appendix.

4.3.3.2 Data collection and prep

Although no data was collected, a number of processes were undertaken in order to prepare the data for the study. In order to build SES descriptions to answer sub-question 1, the Quintile ranking of each school in the population and sample needed to be established. The prePIRLS 2011 data was downloaded from the IEA website and then merged, using IDB Analyzer, with the Quintile information received from the DBE. School names were kept confidential at all times. The Quintiles, once established, were then entered into the prePIRLS 2011 datasets. Next, the items that related to SES were identified from the four background questionnaires. Using the conceptual framework for the study, each item was classified by level, according to Bronfenbrenner's bioecological model, and the PIRLS Assessment Framework. The results of the selected SES items were used to populate the descriptions of the Quintiles by levels.

4.3.3.3 Data analysis

The SES descriptions created in order to answer sub-question 1, consisted of the reading literacy test results and the results of the identified SES items. PVs and the identified SES items, which have been operationalised through the construct of SES, were grouped according to the five Quintiles. The IEA IDB Analyzer Analysis module allows a function called “percentages only” and reports the answers to the relevant items by the percentages of the appropriate responses. Both Quintile and the relevant SES item were entered as the grouping variable. The weighting of the results was controlled by student weight. Once processed, the output provided in SPSS showed data for South Africa, and was then divided into Quintile, followed by the division of answers and the percentage of respondents who selected each answer. The standard error for each of the percentage results was also generated. The results of all the tests run were compiled into an Excel document (by level), which facilitated comparison of data by item and Quintile as well as creation of graphs.

4.3.4 Sub-question 2

Sub-question 2 addresses the statistically significant differences in reading achievement between Quintiles.

4.3.4.1 Instruments

The prePIRLS 2011 reading literacy test results were used as a proxy (Kimberlin & Winterstein, 2008) for determining the achievement of Grade 4 learners across the Quintiles. Reading literacy scores were provided in the form of PVs and provide estimates for children’s reading achievement relative to the international centre point of 500.

4.3.4.2 Data collection and prep

As with sub-question 1, the second sub-question also required the school's Quintile ranking and made use of the results of the reading literacy test, in the form of PVs. Unlike sub-question 1, however, the data from the background questionnaires was not used.

4.3.4.3 Data analysis

In order to answer sub-question 2, concerning the statistically significant differences in reading achievement between the Quintiles, the PVs obtained from the reading literacy test were used. The reading test average, expressed in terms of a PV relative to the international centre point of 500 were determined for all schools that were tested across each of the five Quintiles. This was established through the use of a simple linear regression, which enabled the researcher to determine if there were significant differences between the reading literacy achievements in the Quintile groups. A regression analysis also showed how much of the reading literacy score could be explained by the specific grouping variable, in this case, Quintile, which in turn helped to predict the outcome variable (Field, 2009), namely Grade 4 reading literacy achievement.

Using the IDB Analyzer Analysis Module, a regression was run. The independent variable of 'Quintile' was set as a categorical variable. This variable was also coded as a dummy variable with five categories (representing each of the Quintiles) with the constant set as Quintile 1. In other words, the results of each of the other Quintiles were compared to Quintile 1.

The PV was set as the dependent variable, using the "1st to 5th PV: Overall Reading PV1". This means that the five PVs generated by the reading literacy test, as an overall score, were averaged before the regression was performed. One averaged reading literacy score for Quintile 1 was generated. For the consequent Quintiles, the PV was shown as higher as or lower than Quintile 1's PV. The results also report a t-value for the regression coefficient which was then converted into a p-value to show the statistical significance. This statistical significance showed if there were statistically significant differences between each

of the groups as interpreted by means of the r-square value. The R-squared value "is a measure of the amount of variability in one variable that is shared by the other" (Field, 2009), in other words, "the proportion of data explained by the model" (Field, 2009). In this case the researcher sought to determine how much the reading achievement could be accounted for by Quintile.

4.3.5 Sub-question 3

Sub-question 3 seeks to establish to what extent the Quintile system is justified, in reducing inequalities along SES lines, after establishing the difference of achievement in the Quintiles. The information used to answer this question was used in both sub-questions 1 and 2. This discussion was based on the results of the aforementioned sub-questions, as justification for a Quintile system or as proof that a different system could service South Africa better. Since sub-question 3 relies on the data collected and analysed in the previous sub-questions, no additional data preparation was needed.

4.3.5.1 Methodological norms (validity and reliability issues)

According to Martin and Mullis (2008), validity and reliability are "classic attributes of high quality achievement data". Reliability is the "ability of an instrument to measure consistently" (Tavakol & Dennick, 2011, p. 53) and the "extent to which a measuring instrument is repeatable and consistent" (Maree et al., 2007). Regarding prePIRLS, reliability specifically refers to all respondents having answered the same test or questionnaires, and the conditions under which these tests or questionnaires were being answered was the same, the questions were answered in the same way and finally, that all tests were scored in the same way (Martin & Mullis, 2008).

Validity is "the extent to which an instrument measures what it is intended to measure" (Tavakol & Dennick, 2011, p. 53) and requires the instrument to be reliable (Kimberlin & Winterstein, 2008; Pierce, 2008; Tavakol & Dennick, 2011). A high validity would mean that the claims made are supported by evidence from the

data which measured what it was supposed to (Martin & Mullis, 2008). The IEA have gone to great lengths to ensure the data is comparable internationally (Martin & Mullis, 2008). This is important so that when the data shows differences between countries' achievement it is because there is a difference in achievement and not the impact of other variables, such as differences in language. In conducting the PIRLS studies, validity is achieved by ensuring all tests are based on the framework for assessment (Mullis, Martin, Kennedy, et al., 2011), developed and updated through collaboration with a number of stakeholders. This assessment framework explicates accurately what the goals of the study are and how they should achieve (Martin & Mullis, 2008). In all the steps of the study, comparative validity (Martin & Mullis, 2008) is sought after.

For purposes of reliability, Cronbachs alpha was calculated between the component variables in the international prePIRLS 2011 dataset. This is a coefficient showing internal consistency (Cronbach, 1951; Kimberlin & Winterstein, 2008; Tavakol & Dennick, 2011), such that the specific items all measure the same construct consistency. This study measures the internal reliability of the questionnaire data using Cronbach's alpha for the South African prePIRLS 2011 data only and only on those selected variables that serve as indicators of SES across the different background questionnaires, in this case, SES. Cronbach's Alpha is calculated between 0 and 1, with values closer to 1 being more desirable and indicative of sufficient reliability. Where possible, Cronbach's alpha is provided, and describes "how much each item is associated with each other item" (Aron, Aron, & Coups, 1997). When it was not provided there were too few items measuring one concept. Since Cronbach's alpha is most notably used in instrument development (Aron et al., 1997), and this study is not done with the aim of developing an instrument, this was not of concern.

4.3.5.2 Research ethics

Regarding the prePIRLS 2011 study, each of the participants gave informed consent to partake and the learners obtained consent from parents or guardians. Participation was voluntary and brought about no harm or injury to participants. In this secondary analysis, there was to be no direct contact with respondents, which

eliminates many ethical challenges that primary data collection might encounter. The use of the reading literacy test scores and the questionnaire data are not linked to participant names which ensure confidentiality. The names of the schools that provided data will not be named in the research. By conducting this study, the participants' rights and welfare have not and will not be violated.

Ethical clearance was requested shortly after this proposal was defended. The application was submitted to the University of Pretoria's Faculty of Education ethics committee and approval was obtained.

4.4. CONCLUSION

This design and methods Chapter discussed the orientation of the study within wider research as well as the steps followed when conducting this analysis. The methods for data collection, preparation and analysis was elaborated upon, before the issues of relatability, validity and ethics were discussed. Chapter 5 presents the results of the study detailed in Chapter 4.

CHAPTER 5: ANALYSIS OF RESULTS

5.1. INTRODUCTION

The main research question guides the current study and seeks to answer the implications of the evidence from prePIRLS 2011 for the use of a Quintile system in the South African education context. The focus of this Chapter is to address two research sub-questions, namely:

1) How can the Quintiles be described based on the SES indicators from prePIRLS 2011?
2) What are the statistically significant differences in reading achievement between the Quintiles?

In order to answer the first research question, SES descriptions[6] for each Quintile have been compiled by analysing selected items from the school, teacher, learning to read (parent), and learner questionnaires from prePIRLS 2011, then by reporting and analysing the results.

The second research sub-question, aims to establish a statistical difference in reading achievement between the different Quintiles, helping justify the use of a Quintile system. It is also expected that the higher the Quintile the higher the achievement in the prePIRLS 2011 reading literacy test. The statistical difference of achievement between Quintiles has been determined using simple linear regression.

This Chapter begins by examining the South African prePIRLS 2011 reading achievement as well as the mean reading achievement by Quintile. Following that, the Quintiles are described by analysing the identified SES indicators for each of Bronfenbrenner's levels as discussed in Chapter 3 as the conceptual framework as illustrated by Figure 5.1.

[6] For purposes of providing percentages, reference is made to teachers of parents of Grade 4 learners. The sampling unit for prePIRLS 2011 is at the learner'level and representative of the Grade 4 learners, not their teachers or parents.

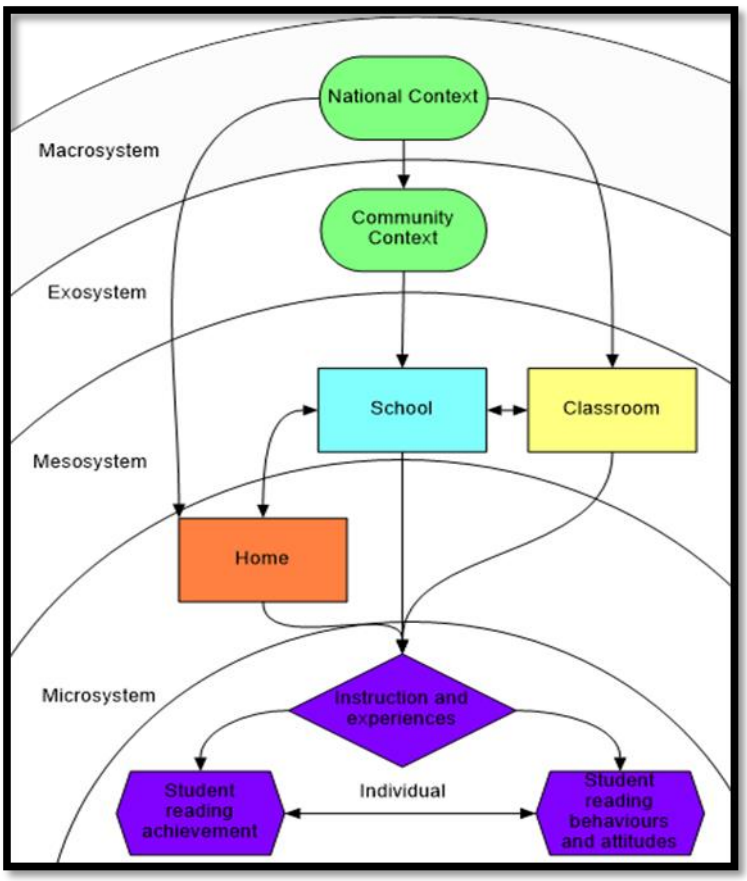


Figure 5.1: The conceptual framework for this study

These levels are the exosystem, the mesosystem, the microsystem and finally the individual. Cross-Quintile descriptive comparisons are made at each of the aforementioned levels, using the prePIRLS 2011 questionnaire data. Following this, the simple linear regression and its application to this study are explained. The results of the regression are provided next, as well as a discussion of the results. Finally, a summary of the results is provided to conclude this Chapter.

5.2. READING LITERACY ACHIEVEMENT IN SOUTH AFRICA

Reading literacy in South Africa has notoriously been below the international average in a number of international comparative assessments. As discussed in Chapter 2, South Africa chose to participate in prePIRLS 2011, an easier alternative, instead of PIRLS 2011.

The reading literacy achievement is measured by using the prePIRLS 2011 reading literacy test. In order to make comparisons between international data, and on such a large scale, the reading literacy achievement 'score' is given in the form of PVs. The reading literacy achievement for South Africa was 460.6 (SE = 3.71), well below the international centre point which is set at 500.

5.2.1 Reading literacy achievement by Quintile

This study requires a disaggregation of the total South African data in order to better understand the reading achievement and the link to Quintile, and thus SES. Figure 5.2 shows the mean reading achievement for each Quintile.

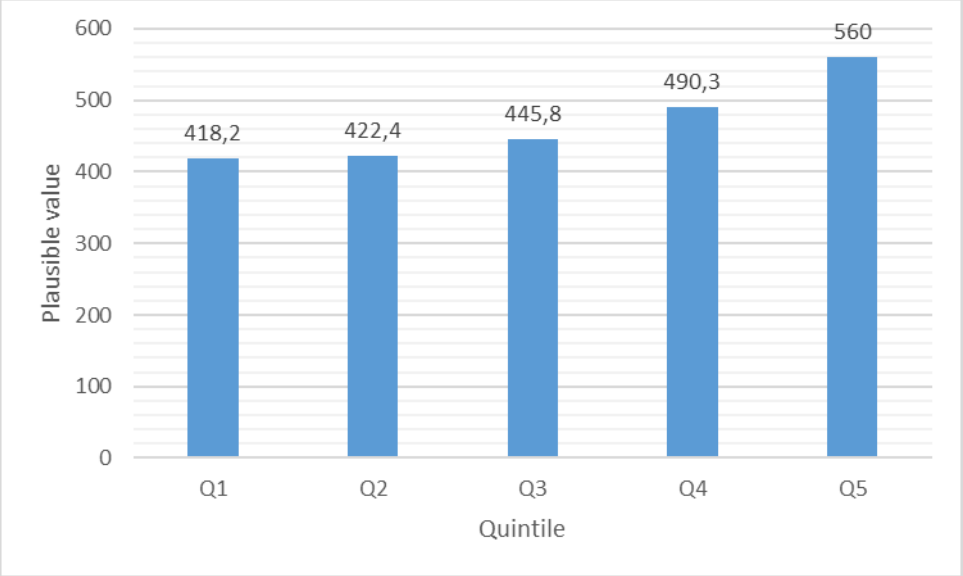


Figure 5.2: South African reading literacy achievement by Quintile

The data shows that Quintile 1 has achieved the lowest score (418.2, SE = 7.5) with Quintile 2 only slightly higher with 422.4 (SE = 5.8) and Quintile 3 slightly higher still with 445.8 (SE = 8.4). Quintile 4 achieved 490.3 (SE = 13.5) and finally Quintile 5 outperformed the other Quintiles with a PV of 560 (SE = 12.5). Quintile 5 is the only Quintile in which the mean score is above the international centre point.

5.3. Cross Quintile comparison

As discussed in the literature review, previous studies have suggested links between achievement and SES (Heaton et al., 2014), hence the SES of each Quintile will be examined in the light of the reading literacy achievement of the Quintile that were discussed above.

5.3.1 EXOSYSTEM

The exosystem level, in the combined conceptual framework for this study, is equivalent to the community context within which the school, family and individual exist. The community context of the Quintiles is explored by looking at selected questions in the School and Teacher Questionnaire, which generates data on the community, and more specifically the socio-economic context. These SES items help describe the type of area in which the school is found, the general economic situation of the area, the amount of participation of parents and the resources from the community. By analysing these items, a general picture emerges of the exosystem of each of the Quintiles.

5.3.1.1 Area description

School principals were asked to respond to a question in the School Questionnaire with regard to the type of area in which their school was situated. The following area classifications were given as options: urban, suburban, medium sized city, small town and remote rural. In the figure below, Quintiles 1 and 2 are made up only of schools in remote rural, small towns and suburban areas. The remaining three Quintiles are different combinations of all five classifications. Quintile 1 has as many as 72.8% (SE = 6.2) of schools reporting their location to be remote rural whereas only 0.3% (SE = 0.3) of Quintile 5 schools are considered by their principals as remote rural. Quintile 4 principals report the highest percentage of urban schools with 19.4% (SE = 9.1).

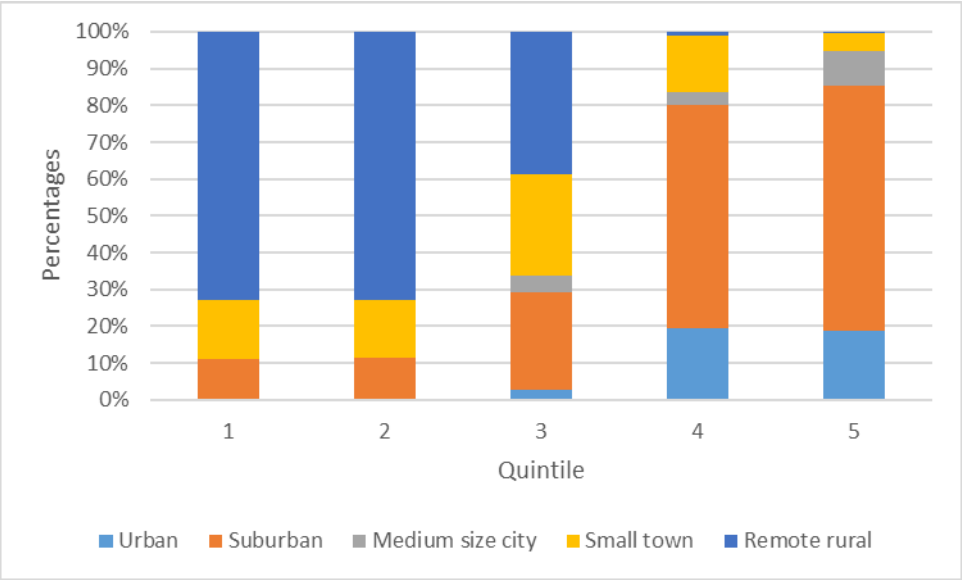


Figure 5.3: Description of the area within which schools in each Quintile are located

5.3.1.2 Community economic features

One of the determinants of SES in the family is the income of the economically active family members. The community SES may thus also be determined by looking at the average income earned by the families in the community. Figure 5.4 shows the average income level of the school's immediate area. Well over 70% of schools in Quintiles 1, 2, 3 and 4 reported that the immediate area of the school has a low income. These four Quintiles all reported less than 1% of the school's community achieving a high average income, with Quintiles 1 and 3 reporting 0%. Quintile 5 has the lowest number of schools reporting a low average income with 42.2% (SE=9.9). This Quintile reported 55.5% (SE = 9.9) of their schools were in areas of medium income and 2.3% (SE = 2.2) were located in high income areas.

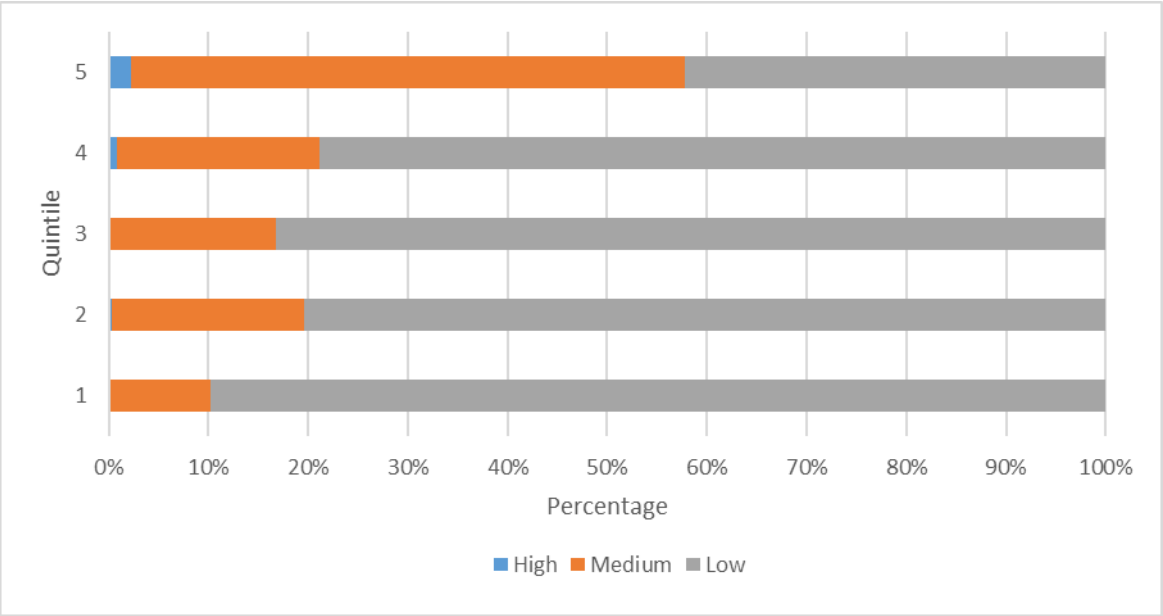


Figure 5.4: Average income level of the school's immediate area

The results of this item agree with those of Spaull (2013), who states that South Africa has a polarised schooling system, divided into two groups with Quintile 5 schools as the 'haves' and the others as the 'have-nots'. Many schools, specifically in Quintiles 1 and 2, could be reporting high levels of poverty in the hope that they might receive more funding. This claim is made anecdotally, and evidence to support it does not exist in the data set. Secondly, the definitions of high, medium and low income are not accurate and perception may affect the principals' answers. Principals were also asked to estimate the average income of the community and the estimated average may be an unreliable reflection of the income. Nevertheless it is a usable measure of their perception of the area's income.

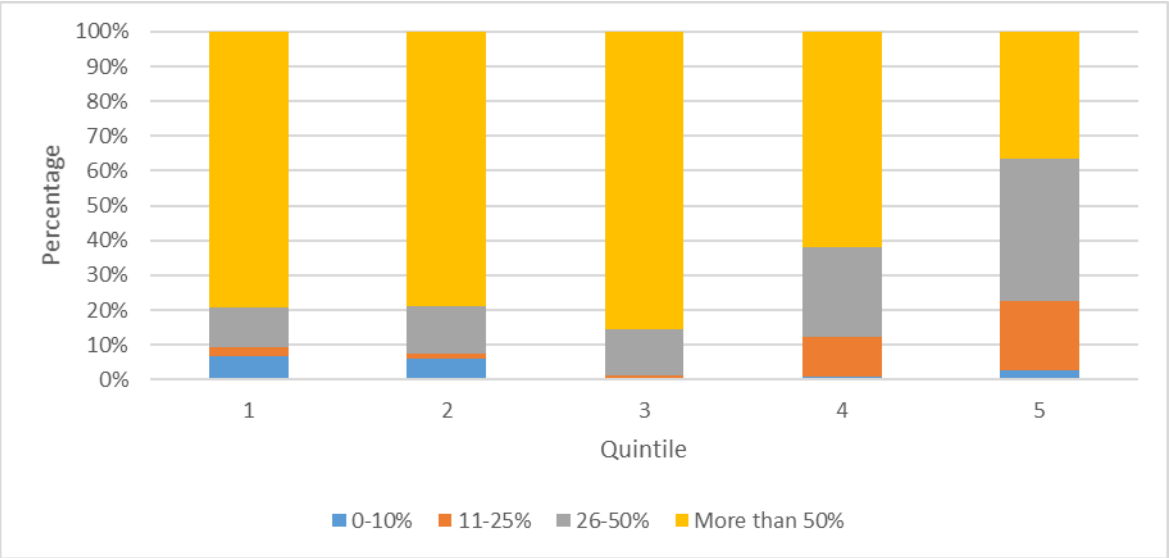


Figure 5.5: Percentage of learners in the school who came from economically affluent homes

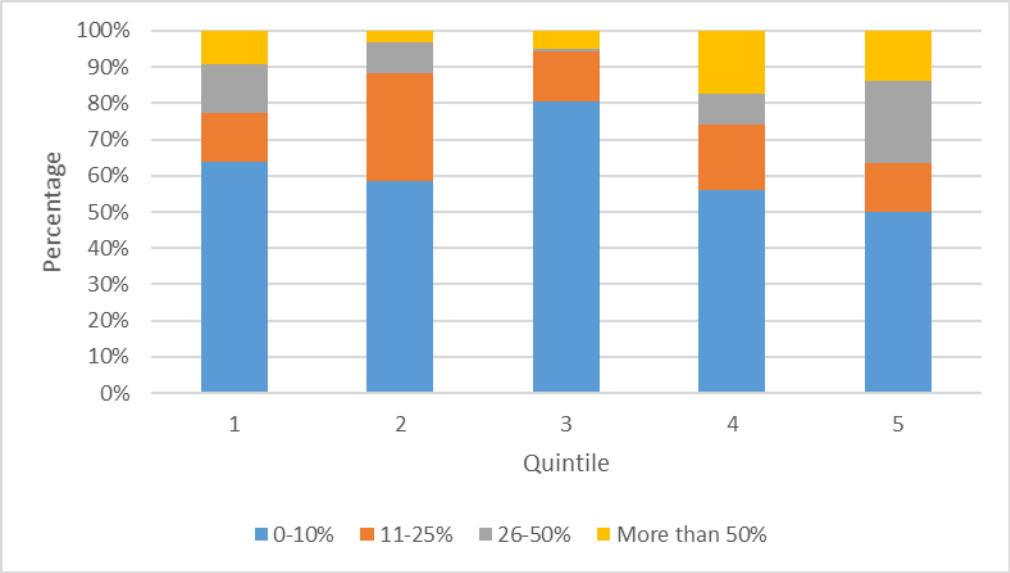


Figure 5.6: Percentage of learners in the school from economically disadvantaged homes

Again, the situation of the principals completing the questionnaires should be kept in mind where analysing the data shown in and Figure 5.6. Quintile 3 seems to be the anomaly in the pattern as the higher the Quintile the lower the amount of disadvantage. In Figure 5.6, a total of 85.6% (SE = 4.2) of principals in Quintile 3

claim that more than 50% of their learners were from economically disadvantaged homes and only 5.1% (SE = 3.1) of these principals believe that more than 50% of their learners were from economic affluent homes (as seen in Figure 5.5). It is unexpected to find so many learners in Quintile 5 schools that are considered disadvantaged, perhaps due to their migrating or traveling to schools far from where they live to seek out a better quality education.

5.3.1.3 Resources

Although generally the availability of resources directly shows the disposable income that families have to spend on 'luxury' resources, in this case non-economic ones are examined. These represent the embodied cultural capital as well as the social capital of an area, the former being the accumulated result of investing time and effort in oneself (Bourdieu, 1986), in this case possessions and resources. Social capital "depends on the size of the network of connections he can effectively mobilize and on the volume of the capital (economic, cultural or symbolic) possessed in his own right by each of those to whom he is connected" (Bourdieu, 1986). Because it is non-economic, the results may be unexpected since the Quintiles should theoretically be based on economic indicators.

In the Teacher Questionnaire, teachers were asked to gauge how often these non-economic indicators were available to the school. No distinct pattern emerges in Figure 5.7, which shows the availability of a teacher-aide that may help learners, especially those with reading difficulties. 34.5% (SE = 9.1) of teachers in Quintile 3 schools claim to have a teacher-aide available at all times. This percentage is higher than the reported percentages for all other Quintiles. Quintile 1 teachers report the lowest percentage of teacher-aides always being available (4.1, SE = 2.1).

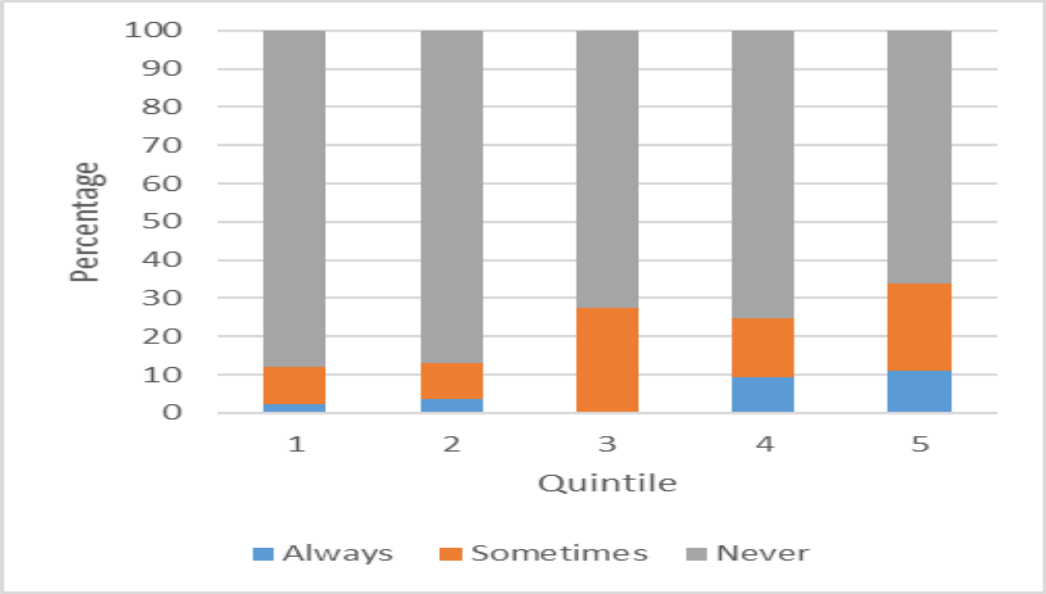


Figure 5.7: The availability of a specialised professional to work with learners with reading difficulties

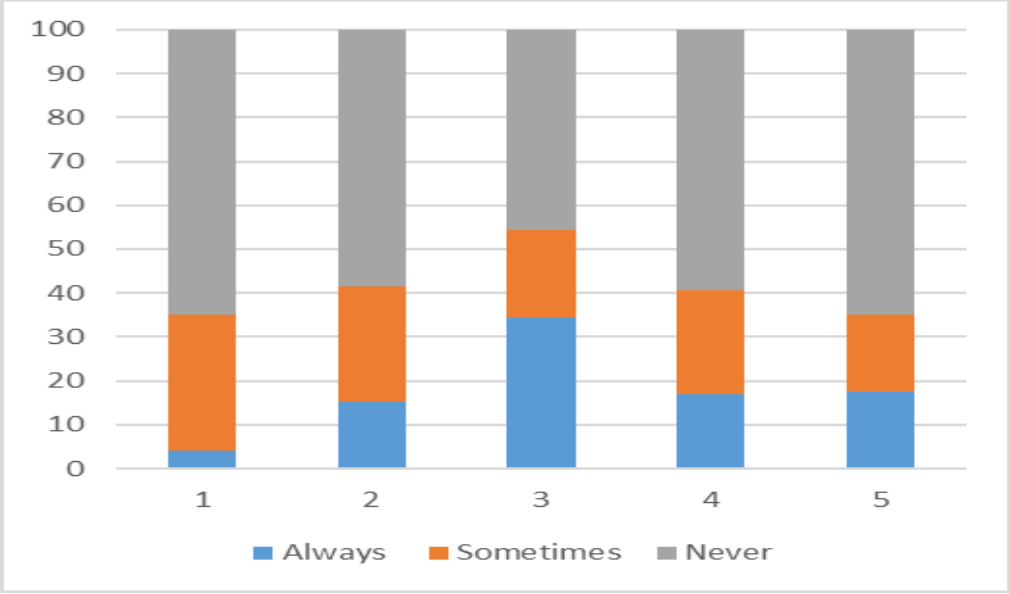
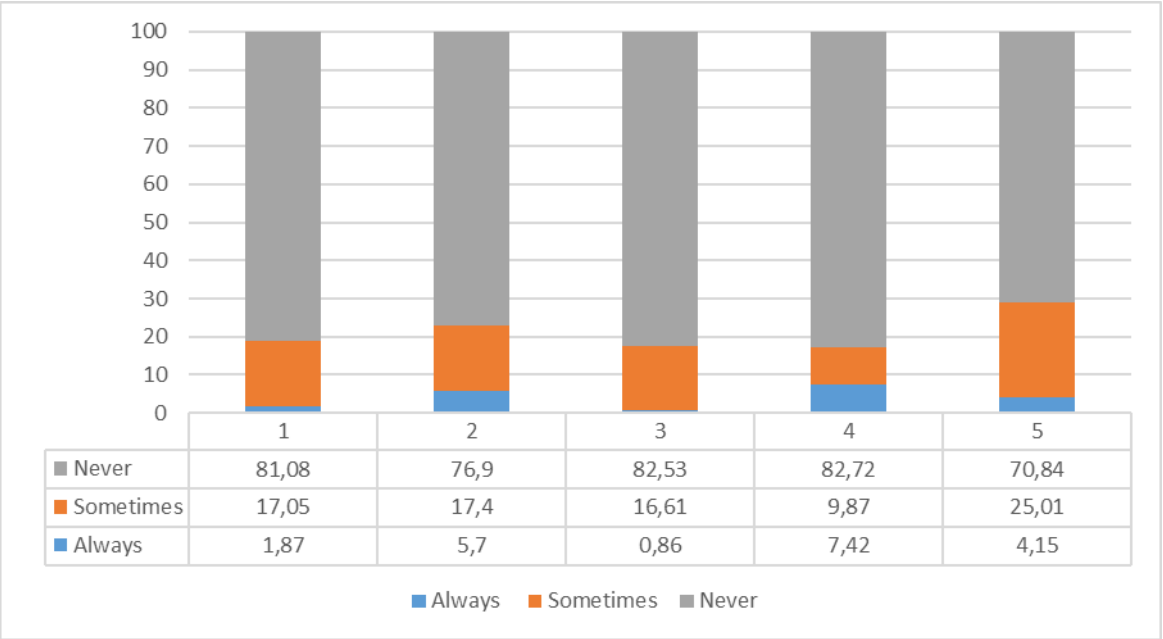


Figure 5.8: The availability of a teacher-aide to help learners with reading difficulties

It is significant that in South Africa no provision is made to provide teacher-aides in government or public schools. Because of this low prevalence it is possible that teachers may not have realised that they are qualified professionals, instead understanding the term 'teacher-aide' as any person who helps in the classroom. This may explain the unexpected pattern seen in Figure 5.8.

Figure 5.7 shows the availability of professionals such as a reading specialist or a speech therapist, to work with learners experiencing reading difficulties. It also has a slight pattern, if Quintile 3 is considered an anomaly, but this pattern is by no means distinct. In this case, no Quintile 3 teachers reported that these professionals were always available, 27.3% (SE = 7.8) reported having these professional available sometimes, and 72.7% (SE = 7.8) never being available. Quintile 5 teachers reported the lowest percentage of specialised professionals never being available, with 66.1% (SE = 8.1).



	1	2	3	4	5
Never	81,08	76,9	82,53	82,72	70,84
Sometimes	17,05	17,4	16,61	9,87	25,01
Always	1,87	5,7	0,86	7,42	4,15

Figure 5.9: The availability of an adult/parent volunteer to help learners with reading difficulties

Again, no distinct pattern emerges regarding the availability of adult or parent volunteers to help with reading difficulties experienced by learners in the class, as seen in Figure 5.9. The highest reported percentage of volunteers that are always available is for Quintile 2, with 5.7% (SE = 3.0) whereas Quintile 1 has the lowest with 1.9% (SE = 1.3). The highest reported percentage of volunteers that are never available, is from Quintile 4 (82.7%, SE = 6.1) whereas the lowest is from Quintile 5 (70.8%, SE = 7.3).

None of these three ‘social capital’ indicators appear to fit a pattern consistent with the Quintile system. Although SES indicators focus largely on economic wealth, the social capital should also be considered as part of an SES indicator.

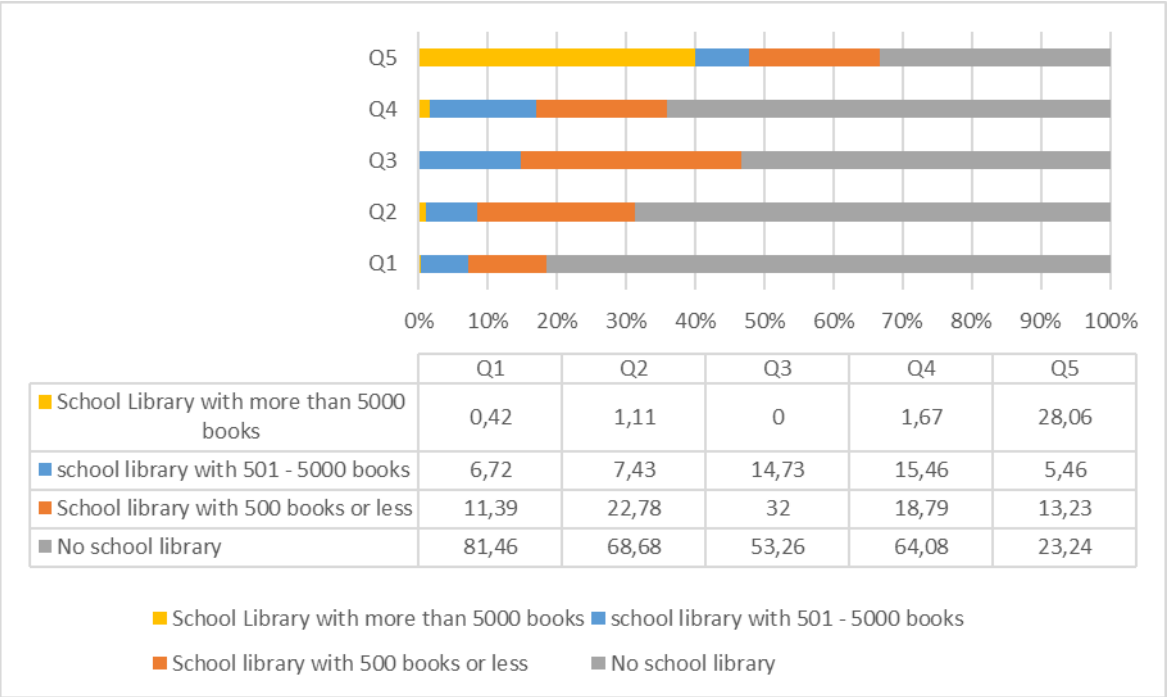
5.3.2 Mesosystem

The mesosystem, within which children exist and learn to read, includes both the school and the classroom, as shown in Figure 5.1**:** The conceptual framework for this study. Both these contexts are explored in this section, primarily in relation to the availability of general resources and those used for teaching, especially the teaching of reading. The total resources can be seen as an indicator of SES at the mesosystem level, in the absence of any measure of income. Again, these indicators are explored using the principal and teacher data acquired from the School Questionnaire as well as the Teacher Questionnaire.

5.3.2.1 General school features

The first resource that schools are often expected to have would be a library and library books. Figure 5.10 (below) generally shows a pattern that the higher the Quintile the more likely the school is to have a library and often the more books it contains. Quintile 3 does however deviate from this pattern, by claiming to have more schools with libraries than Quintile 4 schools.

Quintile 5 has only a small percentage (23.2%, SE = 8.9) of schools without libraries. Quintile 1 on the other extreme has the highest percentage (81.5%, SE= 3.8) of schools without libraries. Less than 2% in the lower 4 Quintiles report having libraries with over 5,000 books whereas Quintile 5 reports that 28.1% (SE = 9.7) of their schools have libraries with more than 5,000 books. A higher percentage of Quintile 5 schools have libraries with over 5,000 books than the percentage of schools with any size library in Quintile 1.



	Q1	Q2	Q3	Q4	Q5
School Library with more than 5000 books	0,42	1,11	0	1,67	28,06
school library with 501 - 5000 books	6,72	7,43	14,73	15,46	5,46
School library with 500 books or less	11,39	22,78	32	18,79	13,23
No school library	81,46	68,68	53,26	64,08	23,24

Figure 5.10: Approximate number of books with different titles in your school library

Libraries may also contain periodicals and magazines, which can be considered a resource. The expectation would again be that the higher the quintile the more periodicals available from the library.

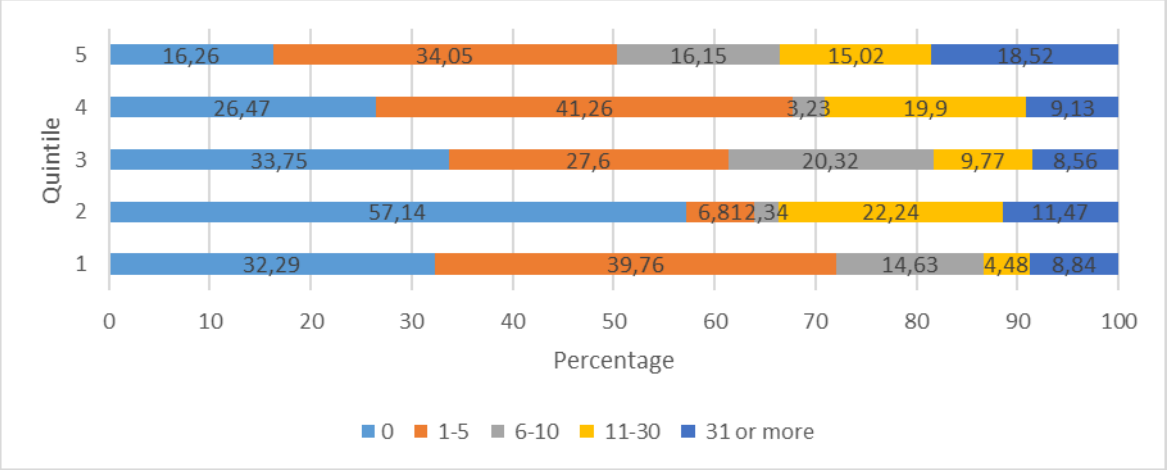


Figure 5.11: Number of titles of magazines and periodicals the school library has

From Figure 5.11, more than half of Quintile 2 schools report having no periodicals in their library. Surprisingly, Quintile 2 also has the second highest reported percentage of schools which have more than 30 periodicals in their libraries, with

11.5% (SE = 9.1). The only higher percentage is that of Quintile 5 schools, with 18.5% (SE = 7.4).

In a technological age, evidence might be expected to show a move away from the library as a resource, towards computers. Figure 5.11 (below) shows the number of computers which the learners participating in the prePIRLS 2011 study have access to at school. All Quintiles reported that most of the schools had between 0 and 50 computers. Figure 5.12 shows that the highest reported percentage of learners without access to computers (65.7%, SE = 8.4) is in Quintile 2. Quintile 3 schools, however, are the only schools reporting to have more than 151 and 201+ computers available for instruction purposes. The majority of Quintile 3, 4 and 5 schools claim to have between 1 and 50 computers available.

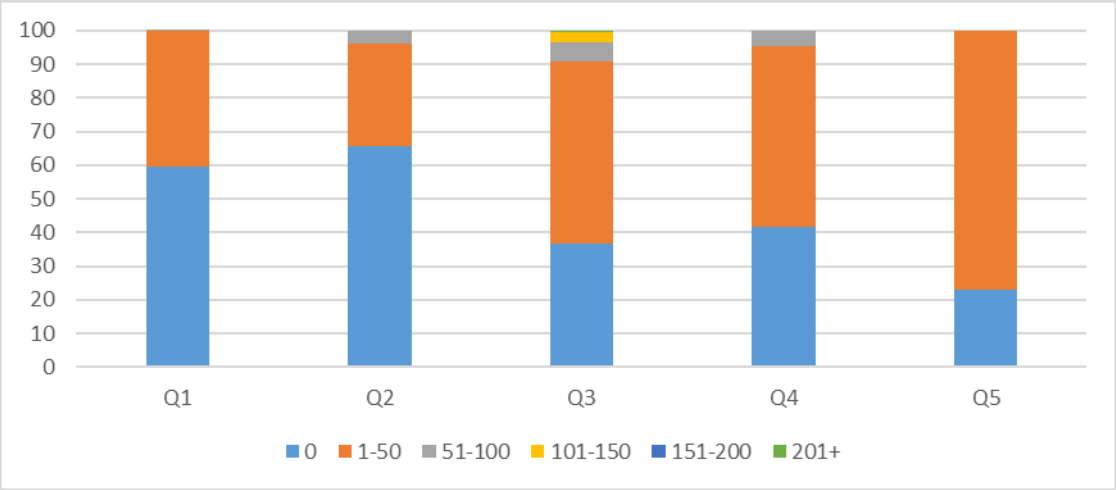


Figure 5.12: Total number of computers that can be used by Grade 4 Learners for instructional purposes

Figure 5.13 (below) was compiled using a number of general resource indicators from the School Questionnaire, in which principals were asked to gauge how their school's capacity to provide instruction was affected by a shortage or inadequacy of certain resources, for instance:

- Instructional materials
- Supplies
- School buildings and grounds

- Heating, cooling and lighting systems
- Instructional space
- Technologically competent staff
- Computers for instruction

Figure 5.13 shows the percentage of principals who reported that problems with the included resources had a noticeable effect on teaching. For example, the lack of technologically competent staff has a larger association on the capacity for Quintile 2 schools to provide good education than any other Quintile. Quintile 2 also records the highest percentages for inadequate school buildings and grounds (29.3, SE = 8.0), heating and cooling systems (27.5, SE = 6.2) and computers for instruction (40.5 SE = 7.83). Quintile 3 reports the highest percentages for the lack of instructional materials and instructional space affecting the ability to provide instruction 'a lot', with 23.4 (SE = 6.2) and 24.1 (SE = 7.8) respectively. Cronbach's alpha was calculated at 0.658 for the variables shown in figure 5.13. For such a large data set, a consistency larger than 0.6 is acceptable as reliable.

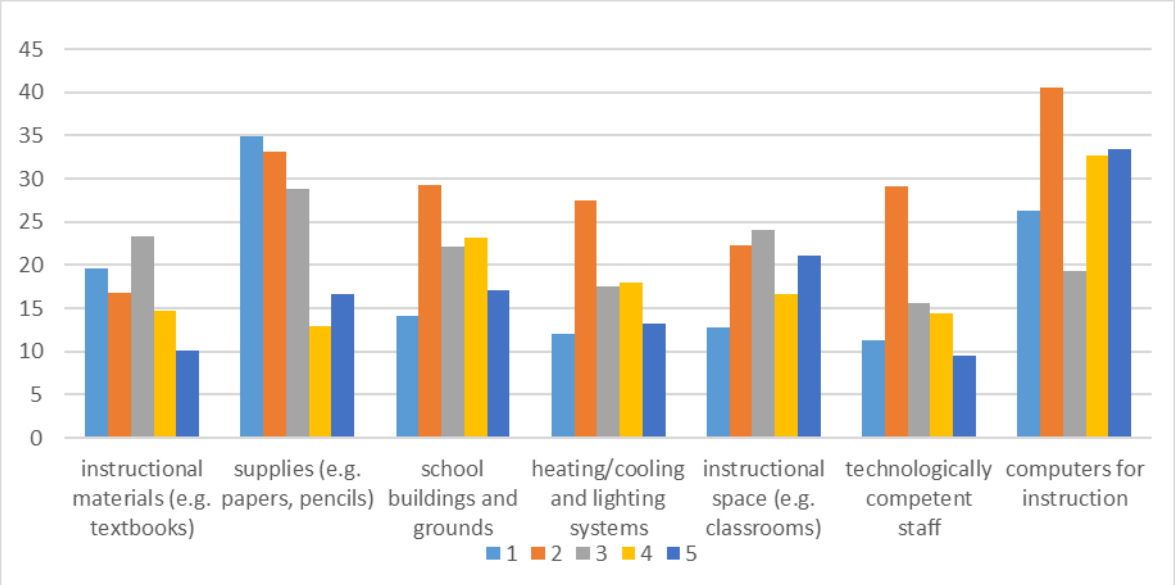
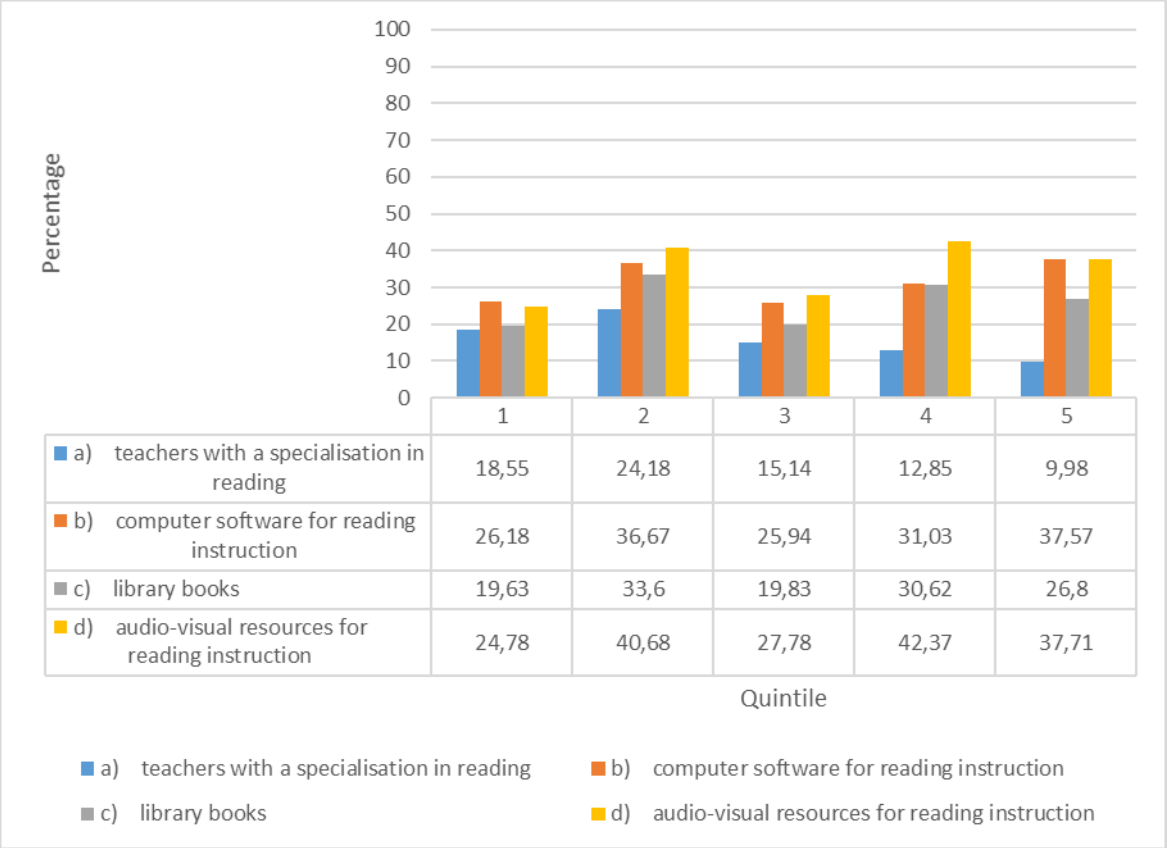


Figure 5.13: Schools reporting that their capacity to provide good education is heavily affected by sthe following shortages

Since Quintile 1 learners are considered the neediest due to the SES of their community, according to the DBE it is expected that their lack of resources would be high, however, Quintile 1 only has the highest percentage in one resource

examined, i.e., the lack of supplies. This question does not examine the shortage of a resource, however it does seek to determine how much the perceived shortages affects teaching at the schools.



	1	2	3	4	5
a) teachers with a specialisation in reading	18,55	24,18	15,14	12,85	9,98
b) computer software for reading instruction	26,18	36,67	25,94	31,03	37,57
c) library books	19,63	33,6	19,83	30,62	26,8
d) audio-visual resources for reading instruction	24,78	40,68	27,78	42,37	37,71

Figure 5.14: Percentage of teachers claiming that the lack of the identified reading resources affect their teaching

Figure 5.14, like Figure 5.13, also shows the percentage of teachers claiming that a shortage of a certain resource impacted their teaching 'a lot'. These resources were more specific to the teaching of reading. Because it was expected that Quintile 1 had the lowest SES it was unexpected that Quintile 2 would have the highest percentage of claims that their teaching was significantly affected by lack of teachers with a reading specialisation (24.2%, SE = 6.7), computer software for reading instruction (39.7%, SE = 7.6) and library books (33.6%, SE = 8.0). It is possible that, again, Quintile 2 schools and teachers over-reported their need in the hope of securing funding or aid, thereby reporting greater levels of need than Quintile 1 schools. The highest reported percentage for a lack of audio-visual

resources for reading instruction, affecting teaching 'a lot', was reported by 42.4% (SE = 10.5) of Quintile 4 teachers.

Cronbach's alpha was also calculated for the percentage of teachers claiming that a shortage of certain resources impact their teaching 'a lot'. The result of this post-analysis was 0.851, showing a large degree of consistency.

Complaints often include school buildings being in disrepair and an insufficiency of classrooms, which results in overcrowding. Teachers were asked how severe these two problems were at their school, as with results illustrated by Figures 5.15 and 5.16 (below).

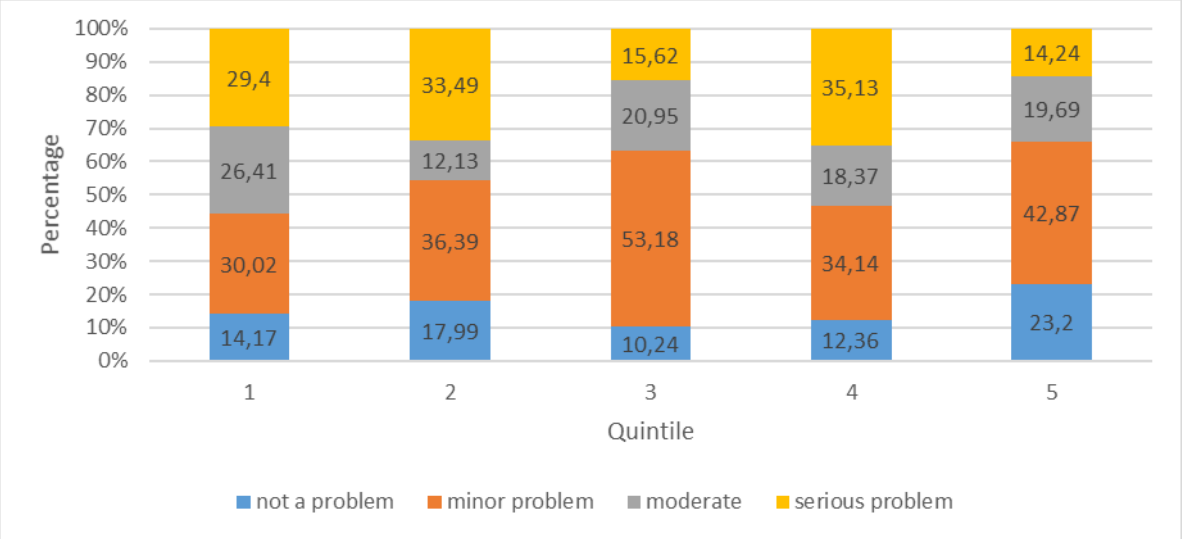


Figure 5.15: The severity of the problem of the school building needing significant repair

The Quintile reporting the highest percentage of school buildings in significant need of repair was Quintile 4. This Quintile is considered to have a higher SES than Quintiles 1, 2 and 3 but 35.1% (SE = 10.6) of teachers report that the building needs significant repair. Quintiles 3 and 5 reported comparatively low scores for the building repairs being a serious problem, with 15.6% (SE = 5.1) and 14.2% (SE = 6.4) respectively. As expected, however, the Quintile reporting the highest percentage in which the buildings repair was not a problem was Quintile 5.

As an explanation of Figure 5.15, Dieltiens and Motala (2014) confirmed in their work, that one of the greatest concerns about the Quintile system was that schools might be assigned to the incorrect Quintile, could have their Quintile ranking changed or that often a change in Quintile was the result of motives other than the reflection of SES. Anecdotal evidence points to parents in a certain Quintile 5 school in Witbank, putting pressure on the management of the school to apply for the school to be 'downgraded' to Quintile 4, in order for the school fees to be lower. Another example highlights the reverse of this situation in which schools try to improve their image by moving to higher Quintiles. The migration of schools to different Quintiles may skew results of need. It is possible that the reason Quintile 4 schools report such need may be migration of needy schools into a higher Quintile, whereas less needy schools may possibly have been moved to a lower Quintile such as Quintile 3. It is significant that Quintile 3 schools pay no school fees, a strong motivation to be moved to a lower Quintile.

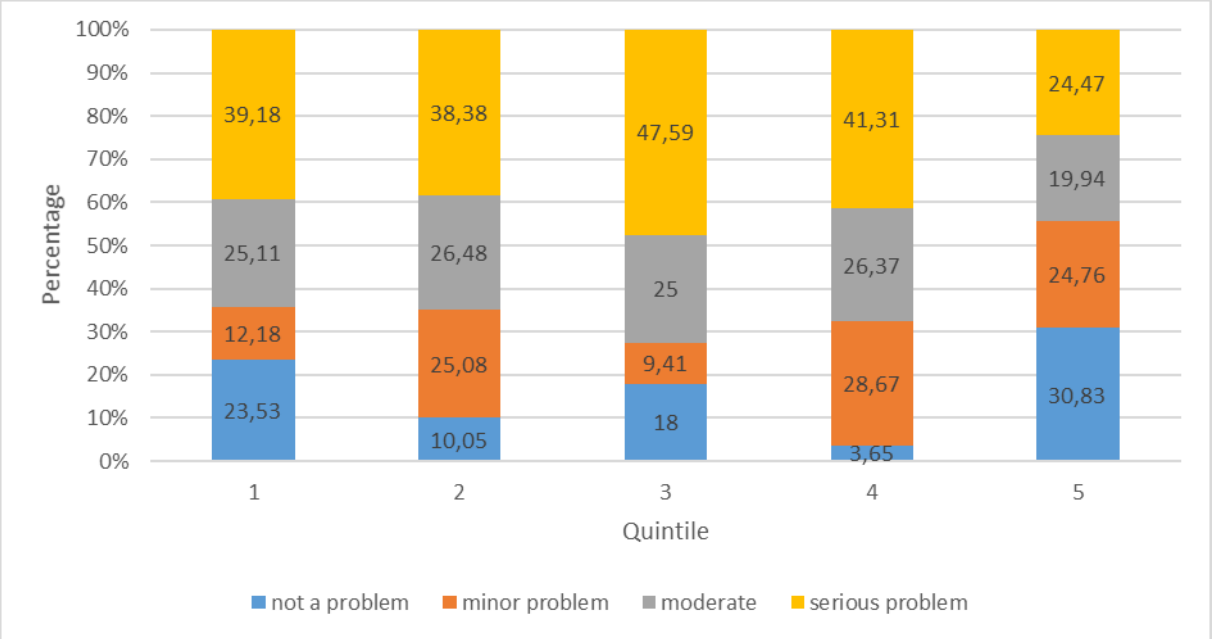


Figure 5.16: Severity of the problem of overcrowded classrooms

Another concern that teachers were asked about was the overcrowding in their classrooms and the extent of the problem. Figure 5.16 (above) shows that almost half of these Quintile 3 teachers believed overcrowded classrooms were a serious problem (47.6%, SE = 8.1). About 40% of Quintiles 1, 2 and 4 teachers also

reported overcrowding as a serious problem in their classrooms. Howie et al. (2012) stated that the "average prePIRLS 2011 class size is 40" (Howie, van Staden, Tshele, Dowse & Zimmerman, 2012). Although Quintile 5 teachers reported the lowest percentage of overcrowding as many as 24.5% (SE = 8.4) regarded it as a serious problem.

Quintiles 1 and 5 also have the highest percentage of teachers reporting that overcrowded classrooms are not a problem, with 23.5% (SE = 6.2) and 30.8% (SE = 7.9) respectively. The explanation for the two extreme Quintiles having similar scores for overcrowding will probably be markedly different. Quintile 5 schools may claim to be full, thus turning away 'extra' learners, whereas other schools may be forced to take on more learners because there are very few, if any, other schools to attend. Quintile 1 schools, which are often found in remote or rural areas (see Figure 5.16) may have fewer children in their vicinity than do urban schools. Another explanation might be that Quintile 1 schools are often the target of many government upliftment initiatives, and as such may have benefitted from the capital inputs of outside organisations.

5.3.2.2 Classroom features

Classroom teaching can be affected by a lack of resources. Figure 5.17 shows the extent to which learners suffer from a lack of nutrition, limiting the teaching in the classroom. It might be expected that Quintile 1 classrooms would be most affected by hungry learners, inconsistent with the figure below since when combining the percentage of those reporting 'some' and 'a lot', it shows that the highest percentages to the lowest follow the order of Quintile 3, Quintile 4, Quintile 2, Quintile 5 and Quintile 1.

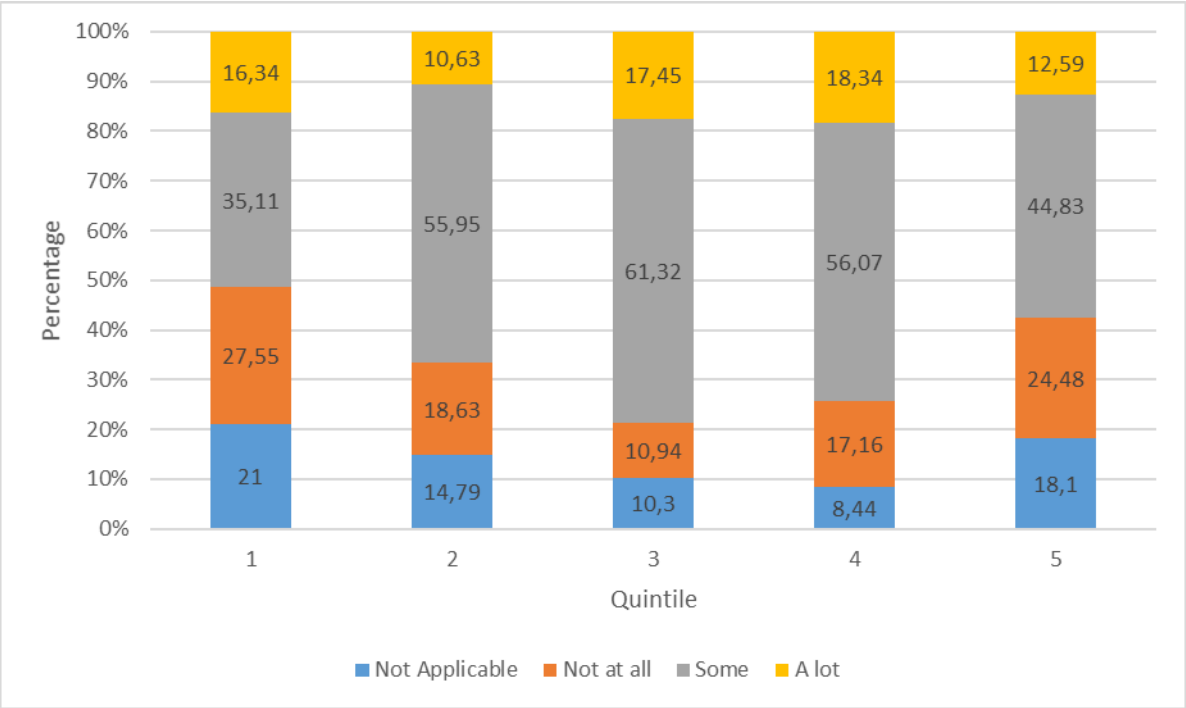


Figure 5.17: Extent to which learners suffering form lack of nutrition limit how you teach the class

A total of 27.6% (SE = 7.7) of learners from Quintile 1 schools reported not being affected by a lack of nutrition. This percentage may be due to large-scale rolling out of feeding schemes.

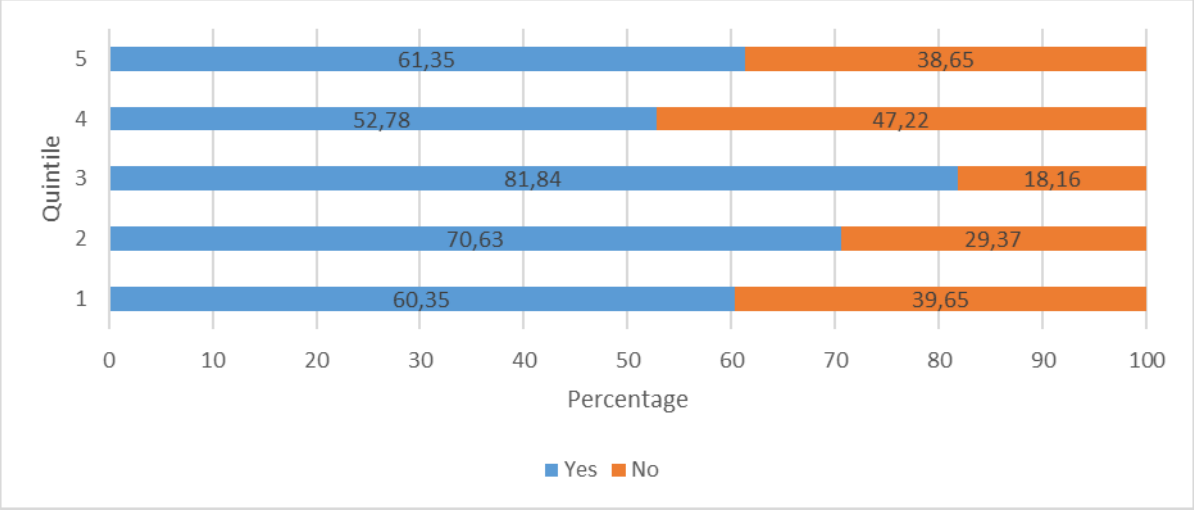


Figure 5.18: Percentage of classrooms that make provision for advanced readers

Figure 5.18 illustrates the percentages of classrooms across Quintiles that make provision for advanced readers. It would be expected that the higher the SES of

the area in which a school is situated, the more finances will be available to spend on resources. Being able to provide material for advanced readers could be considered a resource. Again, it would be expected that Quintile 5 schools would be able to make the best provision for these learners. Contrary to expectations, 81.8% (SE = 6.9) of Quintile 3 schools report that provision was made for advanced readers. Quintile 4 reported the lowest percentage, with only 52.8% (SE = 10.4) of advanced readers having had provisions made.

Figure 5.19 (below) illustrates computer availability during reading lessons, as reported by the teacher. Both Quintiles 1 and 2 are low in their percentage reported, being within a percentage of the other. Quintiles 3 and 4 results are also within a percentage of each other. Quintile 5 reports the highest percentage, with 28.9% (SE= 8.9) of teachers reporting computer access during reading lessons.

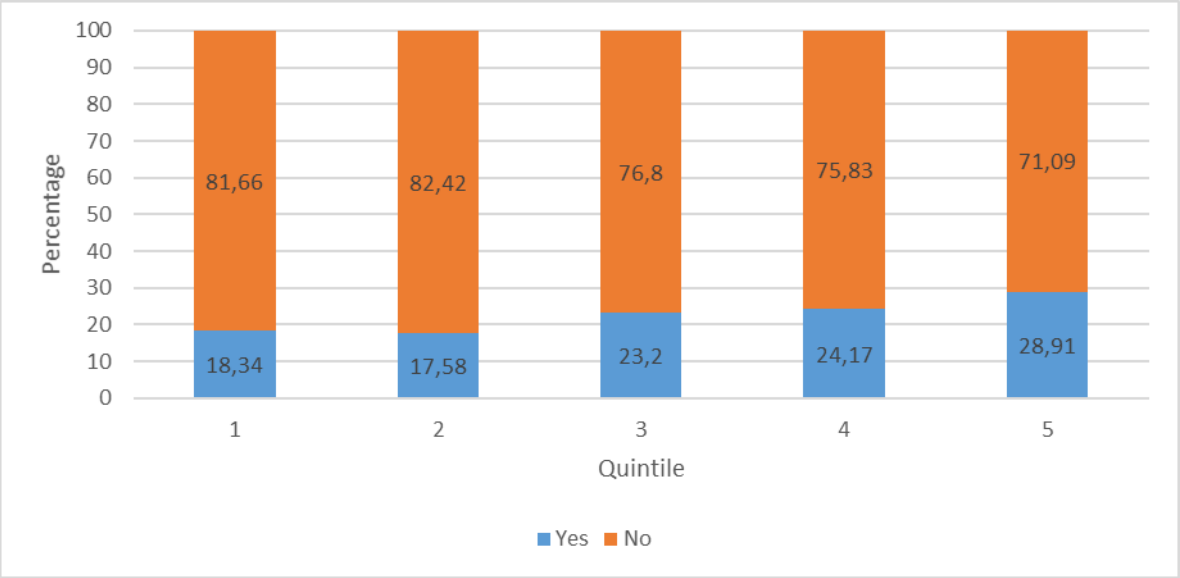


Figure 5.19: Availability of computers to Grade 4 learners in the PIRLS class to use during their reading lesson

Keeping in mind that Figure 5.19 shows that Quintile 5 teachers have the highest access to computers during reading lessons, an examination of Figure 5.20 shows Quintile 5 also has the largest percentage of teachers reporting Internet access, reporting 96.6% (SE = 3.1). This percentage is almost 40% higher than Quintiles 3 and 4 schools. Quintile 2 teachers reported the lowest level of Internet access during reading lessons.

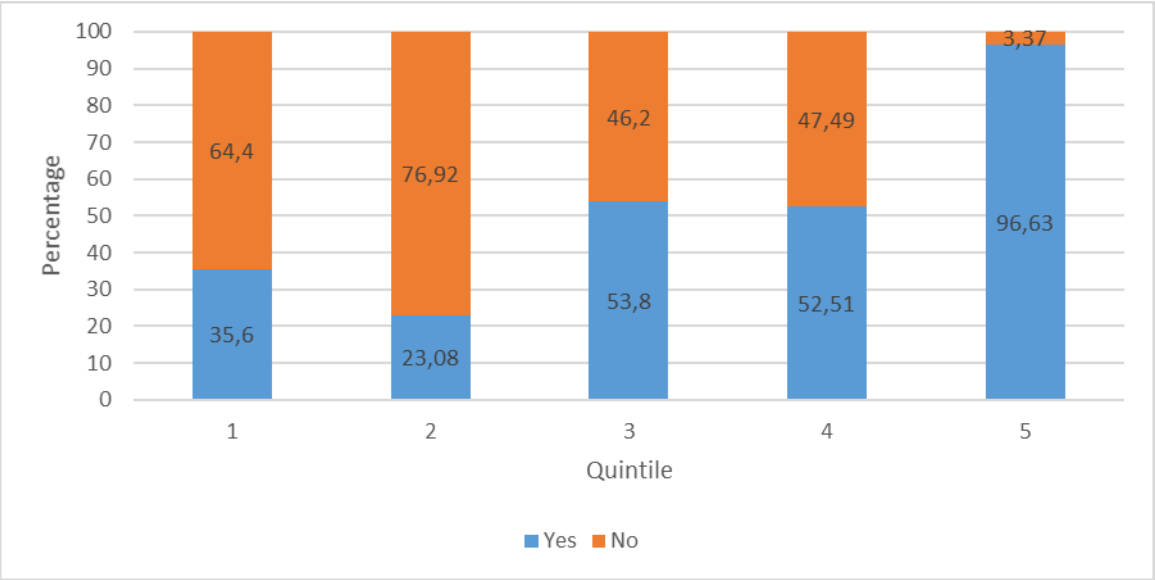


Figure 5.20: Percentage of schools by Quintile with access to the internet

Teaching reading is significantly easier when books and reading material are available to teachers and learners. A clear pattern is evident in Figure 5.21 (below), showing that the lower the Quintile the less likely teachers are to have a reading corner or classroom library.

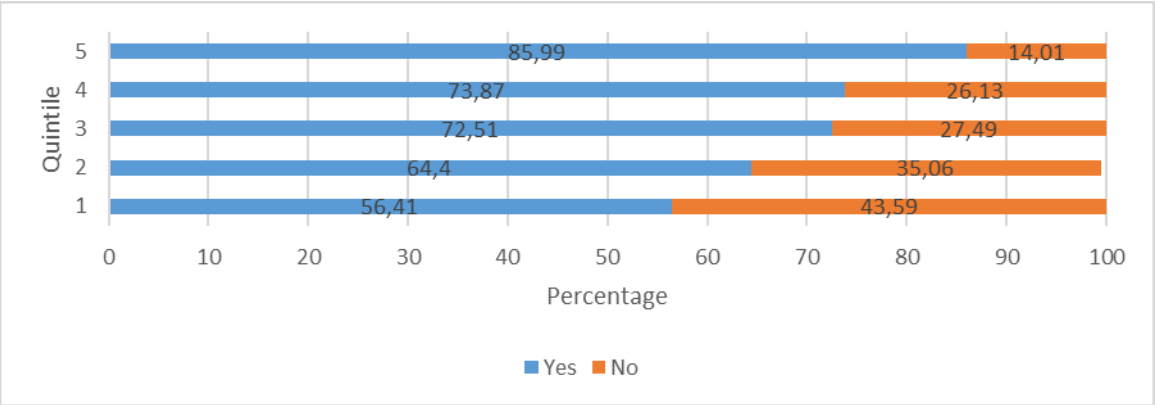


Figure 5.21: The percentage of schools by Quintiles that have a library or reading corner in the classroom

Figure 5.22 (below) shows how many books are in a teacher's classroom library. Improbably, Quintile 2 teachers reported having the highest percentage of the most books, namely more than 100, with 26.4% (SE = 7.7). Quintile 5 teachers reported the lowest percentage of having more than 100 books, with 15.7% (SE = 6.8). At the other extreme, Quintile 1 teachers claimed that 40.5% (SE = 10.8) of

their classroom libraries only had 0 to 25 books. Quintile 3 teachers reported the lowest percentage, having only 0 to 25 books, with 19.9% (SE = 7.7).

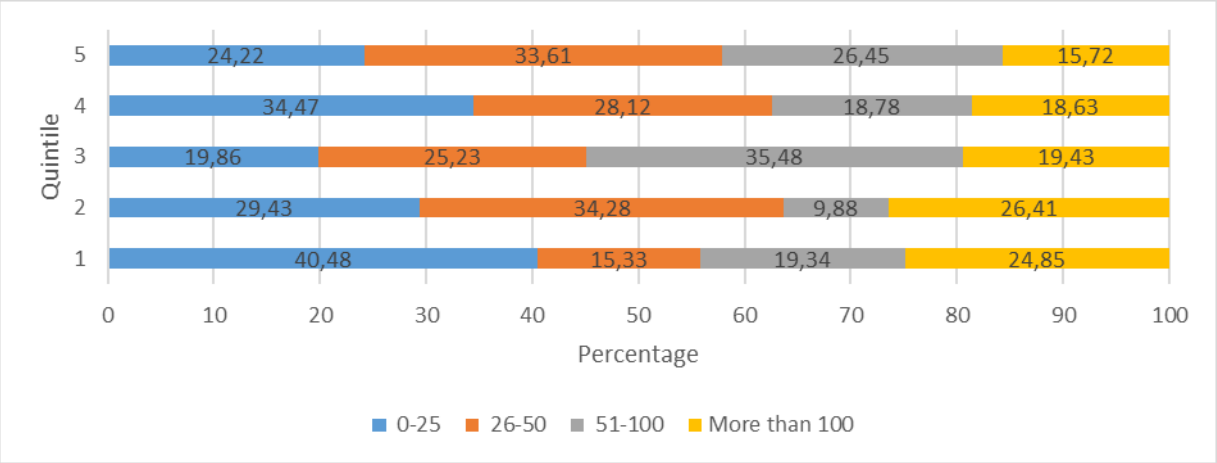


Figure 5.22: the amount of books in the classroom library

Figure 5.23 shows the number of magazine titles in the classroom libraries. Once again, there is no emergent pattern. Quintile 4 teachers report that 57.8% (SE = 9.2) of classrooms have more than 5 titles whereas Quintile five teachers only report that 29.6% (SE = 8.7) of classrooms have more than five titles.

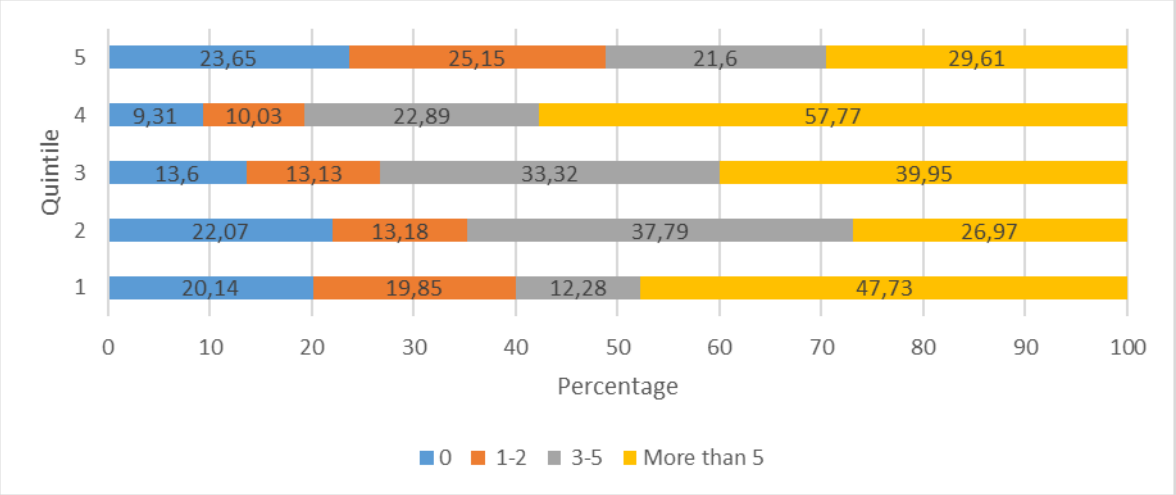


Figure 5.23: Number of magazines with different titles in your classroom library

By looking at the previous graphs, the distribution of resources such as computers, Internet access, libraries, number of books and magazine titles in the

classroom are unevenly distributed, with different Quintiles showing better access in different areas.

5.3.3 Microsystem

Micro-level data was obtained from the parental (Learning to Read) and Learner Questionnaires to the participants within the micro-level, specifically within the home. The data collected at the home or microsystem level should effectively describe the SES of the family and focus on resources as well as parental educational achievement and the occupation of parents. The parental occupation and education items are described for the Quintiles as an insight into the household income, an important factor in SES. Similarly to the previous sections, the availability of identified resources will be explored as well as the child's preschool attendance.

5.3.3.1 Preschool attendance

Although preschool attendance is not a resource it does indicate the willingness of parents to send their children to preschool as well as the cost at which they can afford to do so. Preschool attendance is shown to lead to higher achievement at school at certain levels but it is still unclear whether it is valuable or if it is parents who can afford to send their children to preschool, thus a higher SES that leads to better achievement.

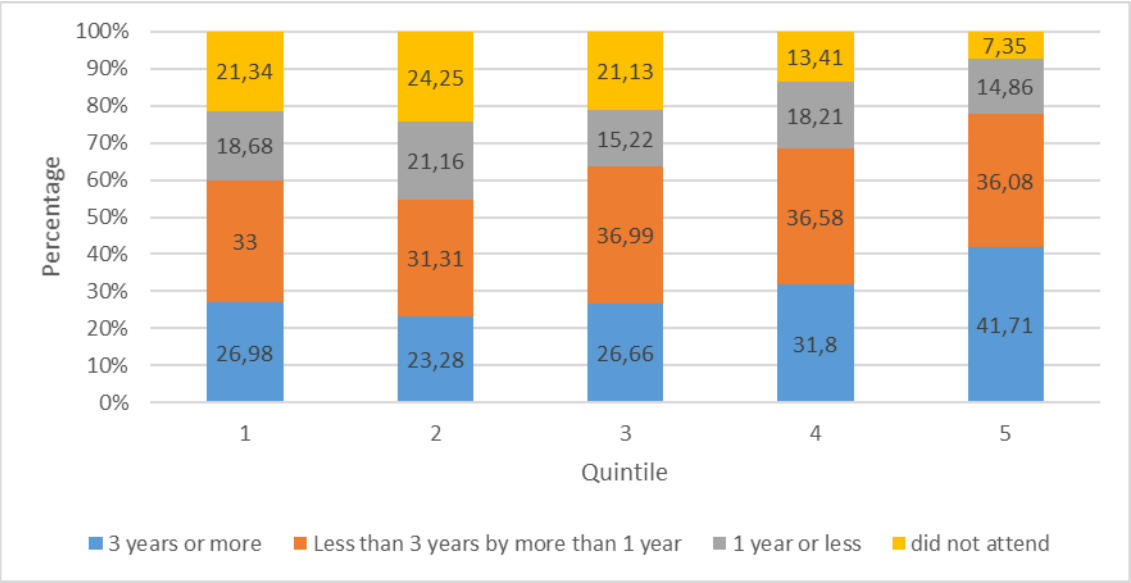


Figure 5.24: Number of years that the child attends preschool, by Quintile

From the figure above it is clear that Quintile 5 has the highest percentage of learners attending preschool, as well as for the longest times. 41.7% (SE = 3.4) of Quintile 5 learners had attended preschool for three or more years, whereas only 7.4% (SE = 1.1) of Quintile 5 learners had not attended preschool. As stated above, the high preschool attendance rate could be due to more disposable income but might also be linked to parental education.

Quintile 2, on the other hand, has the lowest percentage of children who attended more than three years of preschool (23.3%, SE = 2.0) yet they have the highest percentage of children who had not attended preschool at all (24.3%; SE = 2.5). Since attendance at preschool is often related to disposable income of the family it is significant that Quintile 2 appears to have the lowest rate of preschool attendance instead of Quintile 1 that would be expected to have the lowest rate.

5.3.3.2 Parental education

The Learning to Read (parental) questionnaire was completed by either the parent or the guardian of the learner, to determine their highest qualifications obtained. The figure below shows parental qualifications which are equivalent to educational attainment. Although this does not take into account the proficiency, quality or the

years of education, it does offer comparative data with which to examine parental education of Grade 4 learners in South Africa.

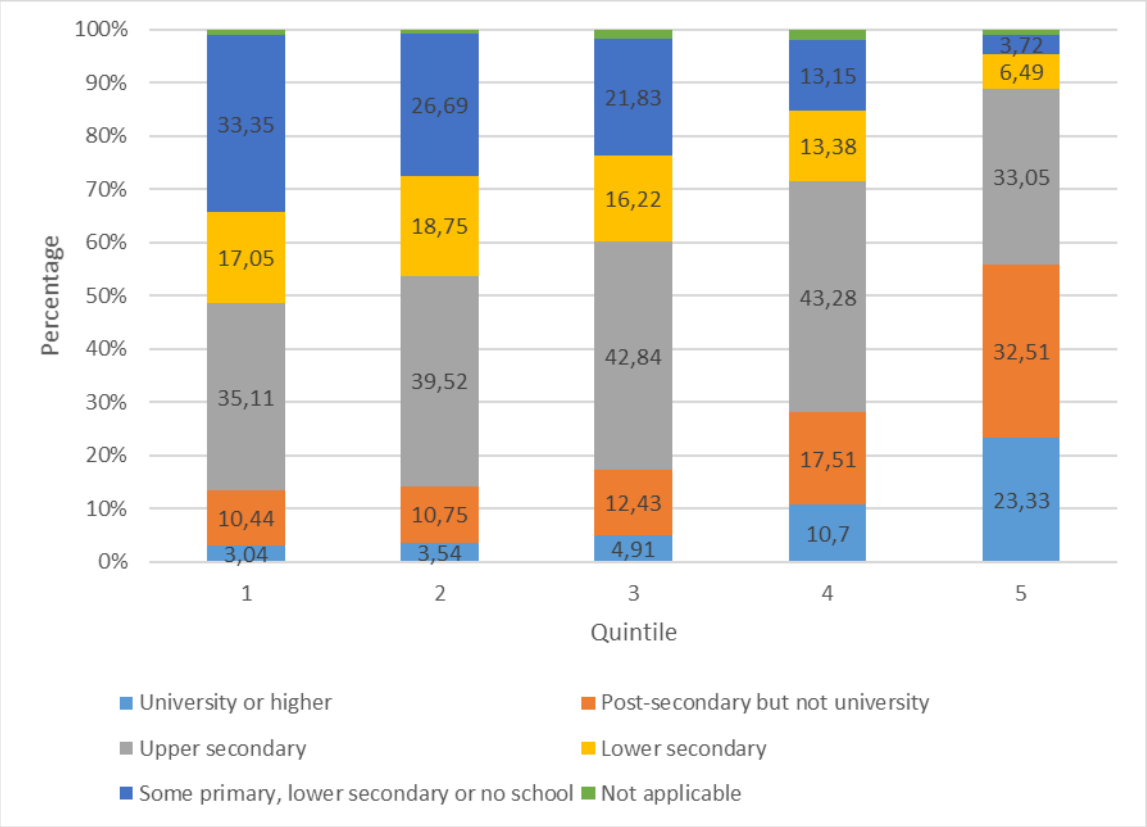


Figure 5.25: The highest level of education completed by the child's father and mother

Figure 5.25 shows that 55.84% of the parents of Quintile 5 learners had completed some form of tertiary education, either post-secondary or university qualifications. At the other extreme, parents of Quintile 1 learners reported that 33.4% (SE = 2.6) had either some primary, lower secondary or no schooling at all. A pattern has emerged regarding some primary, lower secondary or no schooling: Quintile 1 had the highest percentage of 'some primary, lower secondary or no schooling' and this decreases with Quintile, until Quintile 5 with the lowest (3.7, SE = 1.2). The opposite pattern is also evident in university and post-secondary education: Quintile 1 had the lowest percentage or parents with university or post-secondary education. With every Quintile increase, so too do percentages of university or post-secondary education increase.

5.3.3.3 Parental occupation

The SES of a home will also be determined by the household income, which is strongly related to the type of job a parent has. The occupation of the parents was also in the parental questionnaire, which may be influential in determining for how long learners may attend preschool, as well as the available household resources. Figure 5.26 (below), outlining parental occupation, shows similar patterns to those in Figure 5.25. Again, parents of Quintile 5 learners had the highest paying jobs, with over 50% being either professionals or owners of a small business. There was a similar distribution of professions for parents of learners in Quintiles 1 and 2.

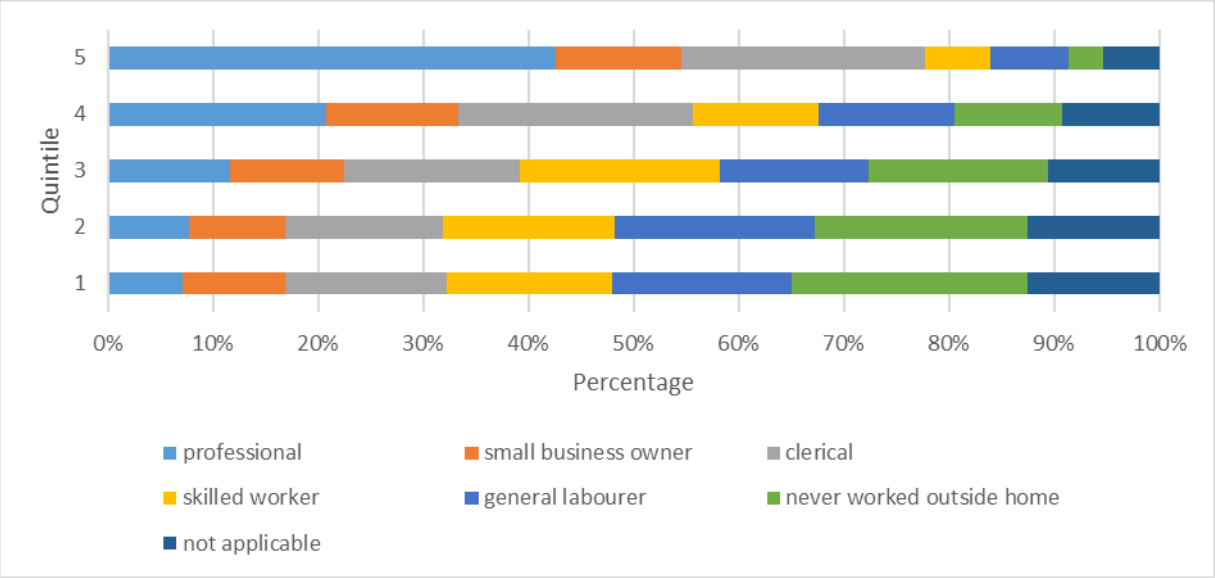
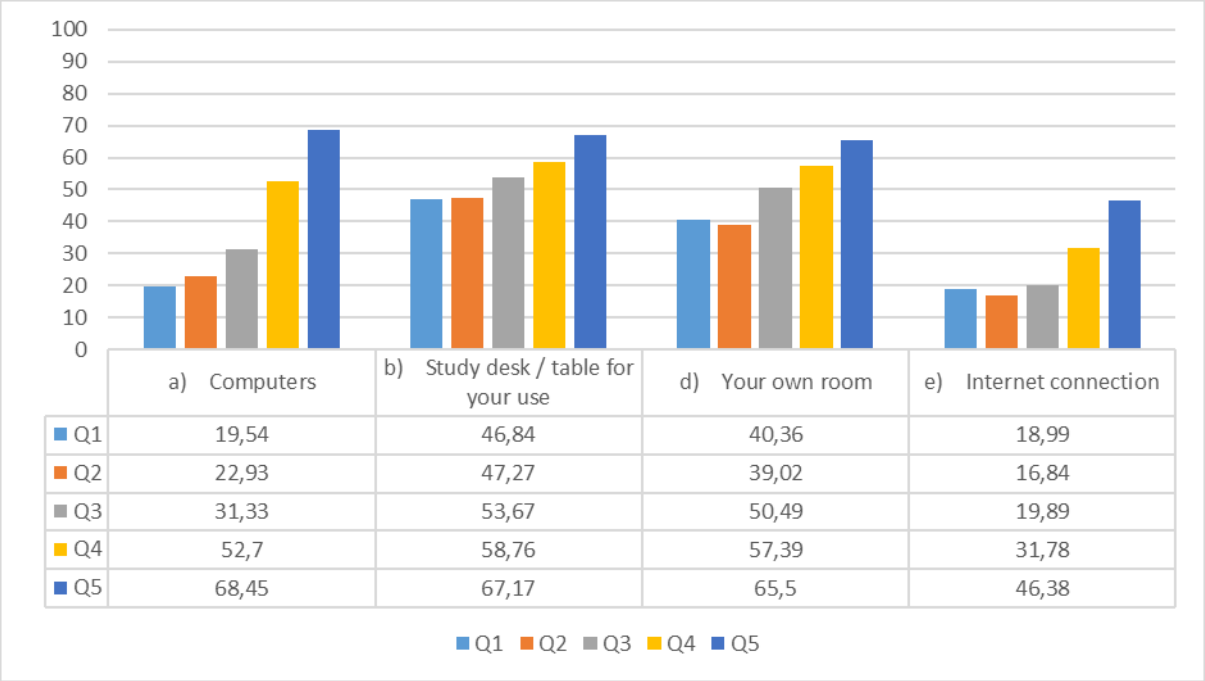


Figure 5.26: Parents' highest occupational levels

5.3.3.4 Home resources

Both parental occupation and education level associated with the availability of certain resources in the home were examined through data collected from a series of questions in the learner questionnaire. Figure 5.27 (below) illustrates the percentage of learners who claimed to have these resources in their home, grouped together to make comparison easier. The general pattern for all the home resources was that Quintile 5 had the highest percentage, followed by Quintile 4 then Quintile 3 and then either Quintile 1 or 2. For instance, Quintile 2 had a higher percentage of learners who had computers in their homes than Quintile 1,

but Quintile 1 had a higher percentage of learners reporting their own rooms and Internet access.



	a) Computers	b) Study desk / table for your use	d) Your own room	e) Internet connection
Q1	19,54	46,84	40,36	18,99
Q2	22,93	47,27	39,02	16,84
Q3	31,33	53,67	50,49	19,89
Q4	52,7	58,76	57,39	31,78
Q5	68,45	67,17	65,5	46,38

Figure 5.27: Availability of the identified resources according to learners

In the learner questionnaire, learners were asked to report on the number of books they had in the home. Figure 5.28 shows the results of this question in the prePIRLS 2011 learner questionnaires. Quintile 2 learners reported having the highest percentage in both the least and the most books: reporting 58.5% (SE = 2.9) of homes having 0 to 10 books and 8.03% more than 200 books. The Quintile with the highest percentage of 11 to 25 books was Quintile 3, with 31% (SE = 2.3). The Quintile with the highest percentage of 26 to 100 books was Quintile 3, with 21.6% (SE = 1.86).

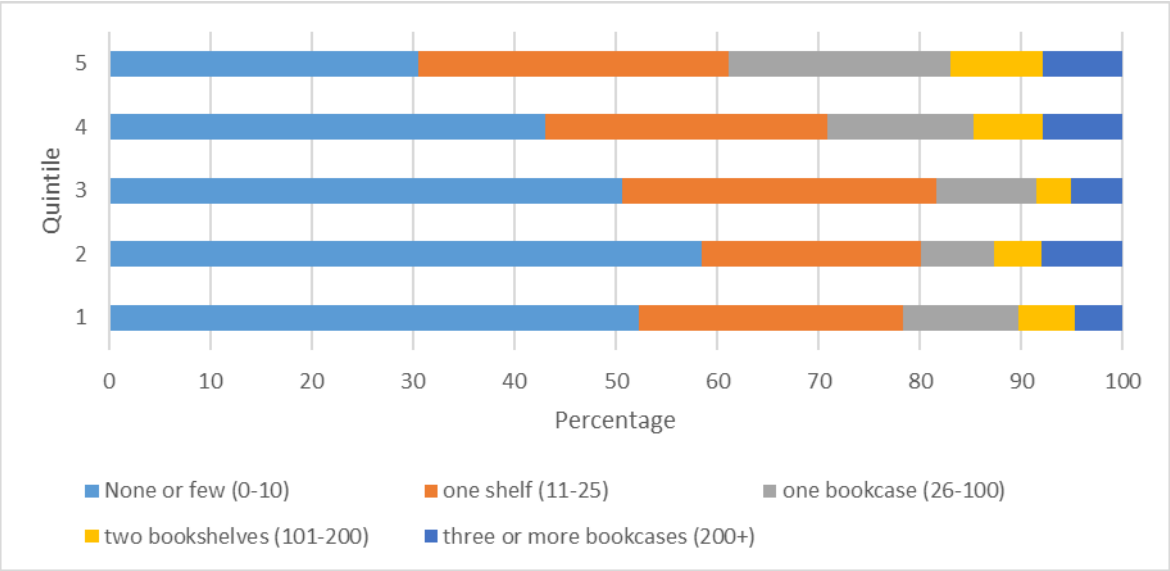
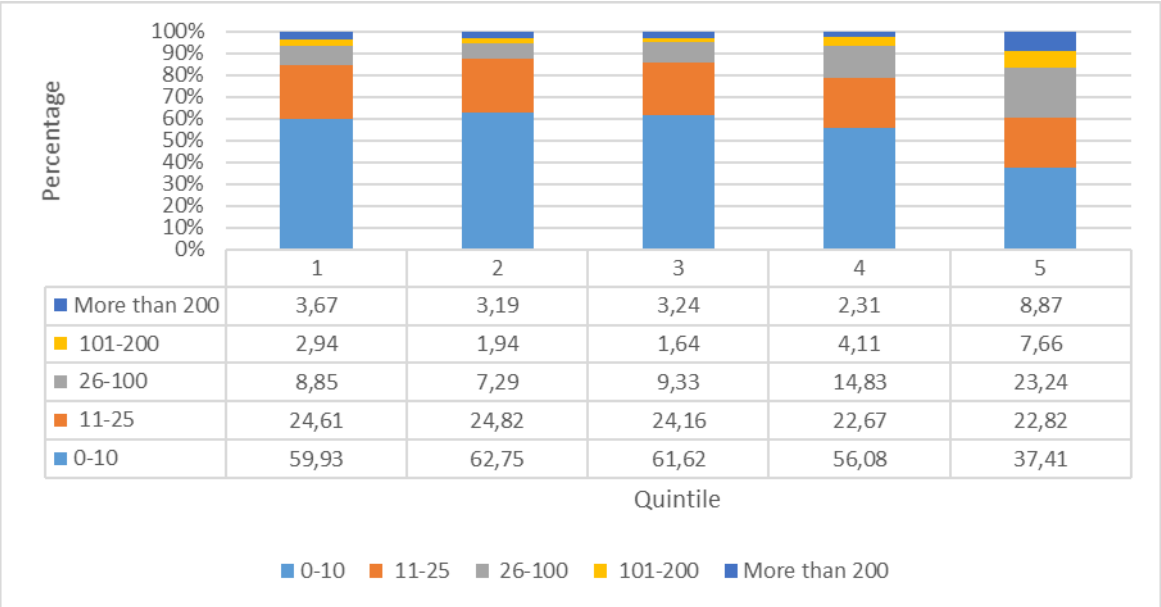


Figure 5.28: Number of books in the home as reported by learners

A comparison can also be made between the number of books in the home reported by the learner and the parents. In the parental questionnaire, parents were also asked to report the number of books in the home. The data fits with the assumption that Quintile 1 should have the least and Quintile 5, the most, due to the increase in SES and thus the available resources. Figure 5.29 (below) shows that Quintile 5 had the highest percentages in the three categories that had the most books: more than 200 books, 8.9% (SE = 1.9); 101 to 200 books, 7.7% (SE = 1.6) and 26 to 100 books, 23.2% (SE = 1.9). The majority of Quintiles 1, 2, 3 and 4 parents of Grade 4 learners reported having only 0 to 10 books in the home.



	1	2	3	4	5
More than 200	3,67	3,19	3,24	2,31	8,87
101-200	2,94	1,94	1,64	4,11	7,66
26-100	8,85	7,29	9,33	14,83	23,24
11-25	24,61	24,82	24,16	22,67	22,82
0-10	59,93	62,75	61,62	56,08	37,41

Figure 5.29: Number of books in the home as reported by parents of Grade 4 learners

A follow-up question from the number of books in the home in the parental questionnaire was concerned with the number of children's books in the home. Figure 5.30 (below) illustrates the number of children's books in the home. In a similar way to Figure 5.29, Quintiles 1 to 4 had over 60% of homes with between 0 and 10 children's books. 4.3% (SE= 1.4) of Quintile 5 parents of Grade 4 learners report having more than 100. 70.4% (SE = 2.2) of Quintile 2 parents of Grade 4 learners reported having ten children's books, or fewer, in their homes.

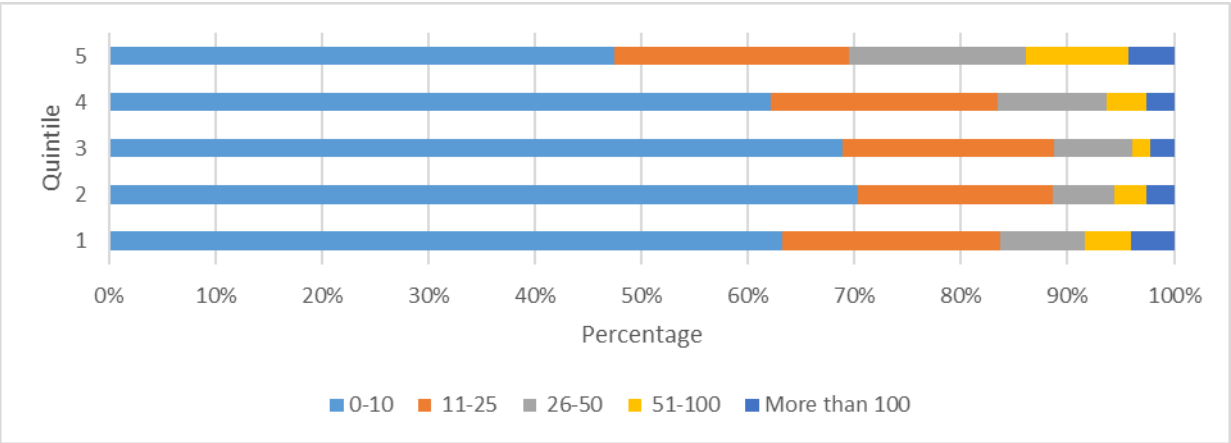


Figure 5.30: Number of children's books in the home as reported by parents of Grade 4 learners

5.3.4 Individual system

The individual system is the one around which the others revolve. Although SES is difficult to measure at an individual level, since the SES is generally determined at the family or micro level, prePIRLS 2011 Learner Questionnaire data allows the individual's use of resources such as computers and library use. In this section, the relationship between the use of resources and the reading achievement of learners is discussed.

The figure below shows how often learners use computers at home. It is interesting to note that 48.8% from Quintile 1 use one every day as opposed to lower percentages of 42.8 (SE = 3.6) and 46.3 (SE = 3.6) for Quintiles 2 and 3 respectively.

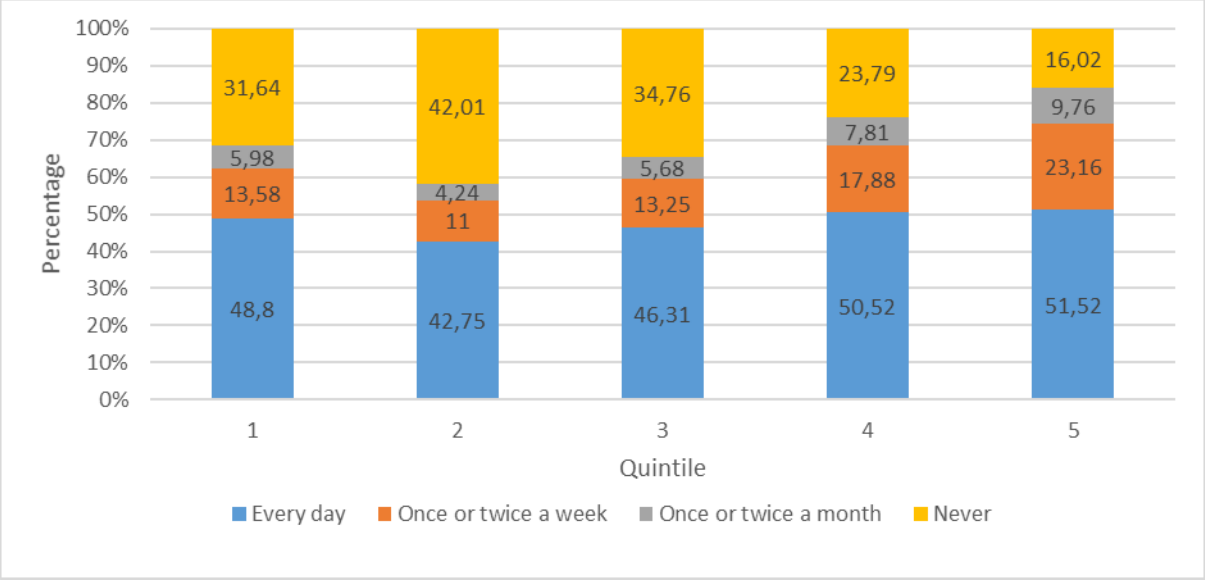


Figure 5.31: How often learners use a computer at home

It was expected that learners from Quintiles 4 and 5 would have better access to computers than the other Quintiles since schools in these areas were more economically advantaged. Quintile 5 had only 16.0% (SE = 2.2) of learners who never used computers at home. Although it was possible that learners might have had access to computers and chose not to use them, it was more likely that those who never used a computer probably did not have one at home. Quintile 2 had the highest percentage of learners who did not use computers, with 42.0% (SE = 4.7),

again showing that there was probably not a computer in the home to be accessed.

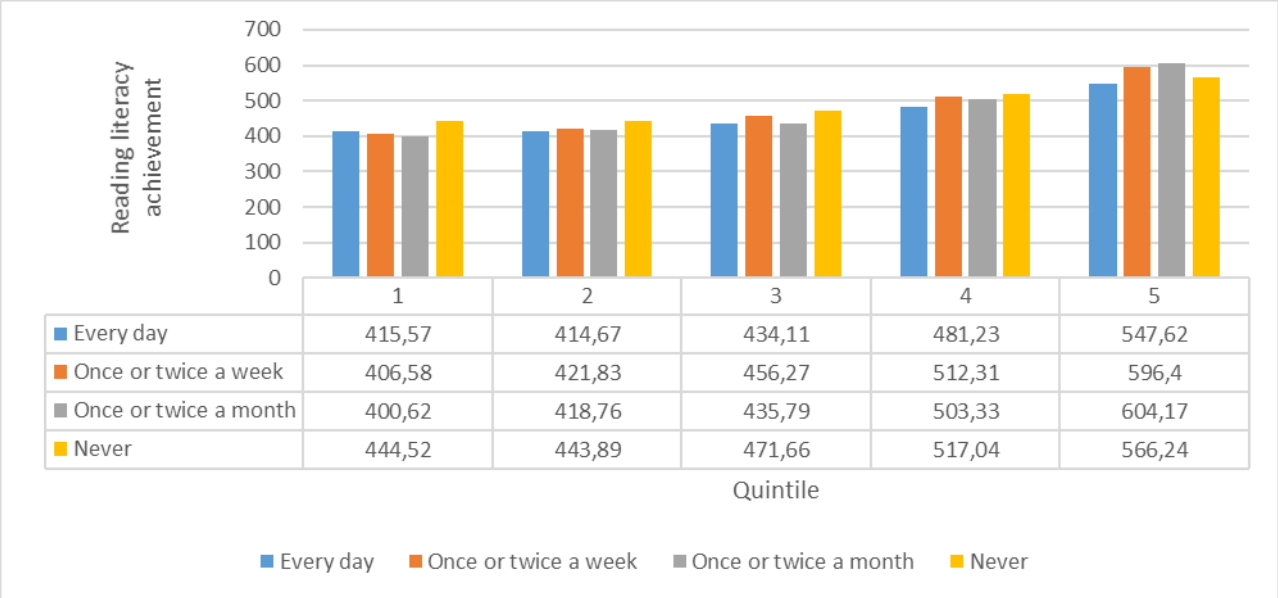


Figure 5.32: Relationship between using computers every day and the corresponding PV across Quintile

The relationship between reading literacy achievement and how often learners use computers shows that those in Quintile 1 who only used them once or twice a month, at home, had achieved the lowest mean score, whereas those in Quintile 5 who used computers the same amount achieved the highest reading literacy average (604.2, SE = 11.6). In Quintiles 1, 2 and 3, the pattern was that learners who did not use computers had achieved higher reading literacy results than other learners in their Quintiles. This is different for Quintile 4 and 5. Based on Figure 5.32, Quintile 5 learners had the highest reading literacy achievement, regardless of computer usage.

The graph below shows access of learners to computers at school. The higher Quintiles tended to have a smaller percentage of learners reporting using computers every day at school. In Quintile 1 almost half used computers every day, which was unexpected because it was assumed Quintile 1 schools were the neediest and would thus not have the facilities to provide access to so many learners on a daily basis.

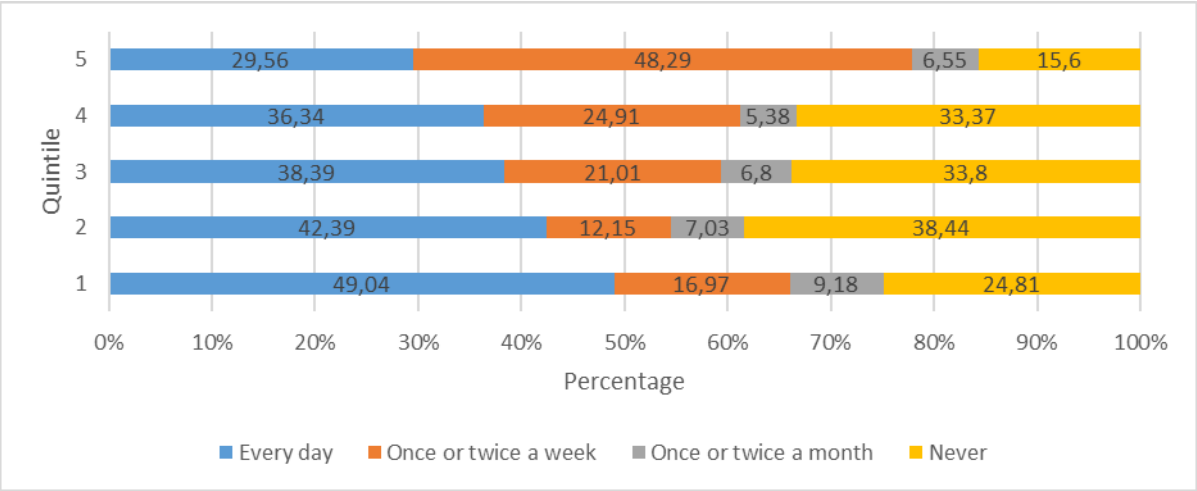
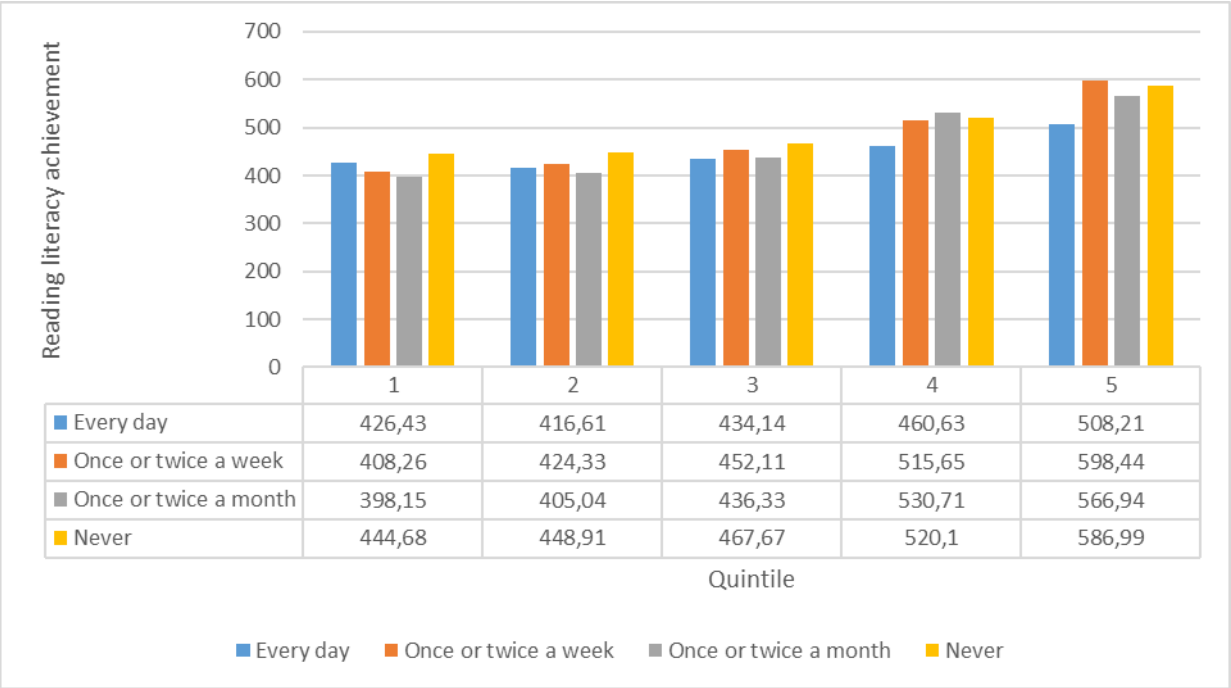


Figure 5.33: Number of times learners in each Quintile use computers at school

Figure 5.33 shows how often Grade 4 learners used computers at school. Surprisingly, Quintile 1 showed the highest percentage, 49.0% (SE = 3.2) who claimed to use them every day. This number decreased with Quintile, with Quintile 5 learners reporting the highest percentage, 48.3% (SE = 3.4) using them once or twice a week.

Figure 5.34 shows that increased access to computer usage at school did not necessarily mean increased results at school. Access to a computer at home did not necessarily correlate with education-related activities.



	1	2	3	4	5
Every day	426,43	416,61	434,14	460,63	508,21
Once or twice a week	408,26	424,33	452,11	515,65	598,44
Once or twice a month	398,15	405,04	436,33	530,71	566,94
Never	444,68	448,91	467,67	520,1	586,99

Figure 5.34: Frequency between computer usage at school and reading literacy achievement

With regard to accessing computers at school, learners who were able to once or twice a week and were in a Quintile 5 school had the highest reading literacy achievement with 698.4 (SE = 6.9) points. From Figure 5.33 one can see that almost half of Quintile 5 learners used computers once or twice a week. There were a number of factors that could be related to the achievement other than time spent on computer results, such as whether or not that time was spent constructively or if already high achievers due to SES simply used computers more. For this reason, the relationship between these two variables was not a simple one.

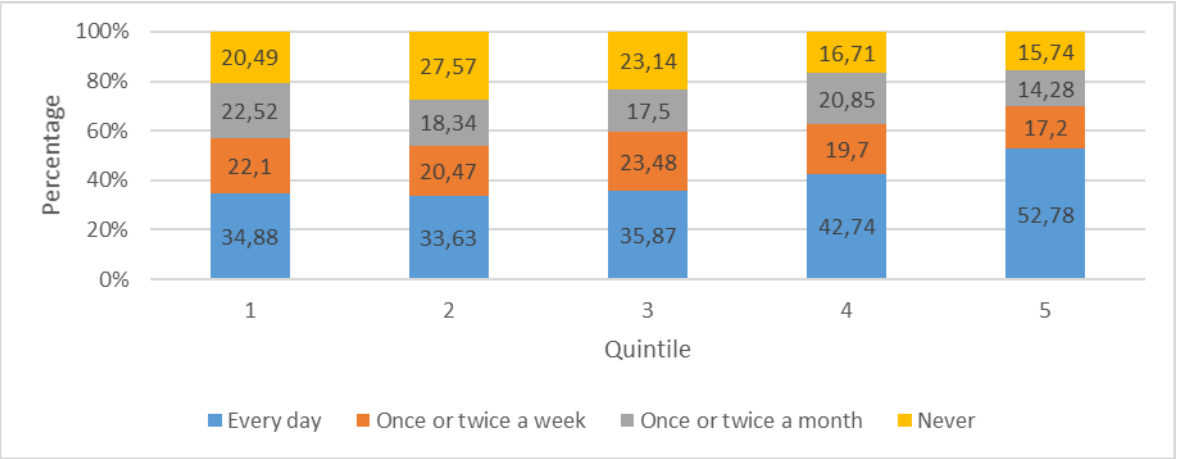


Figure 5.35: How often learners borrow books from the school or local library

Although the act of borrowing books from a library does not require high or low SES, it does indirectly show the extent of access learners have to school and local libraries as well as an indication of their attitude towards reading. 33 – 35% of Quintile 1, 2 and 3 learners claimed to borrow books every day, whereas 42.7% (SE = 2.9) and 52.78% (SE = 3.1) of Quintiles 4 and 5 learners claimed to do the same. Again, the most learners in Quintile 2 (27.57%, SE = 3.8) never borrowed library books.

Examining each of the Quintiles is essential to understand the conditions within which reading literacy is obtained. Examining the conditions gives the following results of reading literacy per Quintile, context within which to understand achievement, in simple linear regression performed in order to answer the second research sub-question.

5.4. SIMPLE LINEAR REGRESSION

In order to achieve the aim of establishing the efficacy of the Quintile system in differentiating achievement, reading literacy achievement of Grade 4 learners in the prePIRLS 2011 study was used as a proxy for general achievement in South Africa. A simple linear regression was used to determine the effect of the Quintile, as a measure of SES, on reading achievement, a proxy for education quality.

The relationship between the variables of SES and achievement is well documented and discussed in Chapter 3 (the literature review). Since the Quintile in which a school is placed is based on SES, if performed correctly the relationship between Quintile and achievement and SES and achievement should be equivalent. In order to answer sub-question 2, the relationship between reading achievement and Quintile needs to be measured. By measuring the relationship between these two variables it is also possible to predict an outcome variable (Field, 2009). In this study the extent to which the school Quintile accounts for reading literacy achievement is predicted.

The regression model is generally represented by the following equation:

$$y_i = B_0 + B_1x_{i1} + B_2x_{i2} + \ldots + B_nx_{in} + E_i$$

Table 5.1: Explanation for the regression model

Symbol	General meaning	Meaning in this study
y_i	Outcome variable	Reading literacy score
B_0	Constant or intercept	Quintile 1
B_1	Is the coefficient of the first predictor (x_1)	Quintile 2
B_2	Is the coefficient of the second predictor (x_2)	Quintile 3
B_n	Is the coefficient of the n^{th} predictor (x_n)	Quintile 4 Quintile 5
E_i	Is the different between the predicted and the observed value of i^{th} participant (or error term)	

In this study, y is the outcome variable or the learner reading literacy score, which is equivalent to achievement. The variable outcome is a function of $B_{0,}$ the constant or intercept, which in this case will be Quintile 1. The differences between the groups will be expressed as reading literacy scores that are higher or lower than the Quintile 1 reading score, since Quintile 1 has been set as the constant.

The International Database Analyzer (IDB Analyzer), an SPSS plug-in created by the IEA to process large-scale data, was used to perform the regression for this study. IDB Analyzer was chosen for this task since the application accounts for student weighting of the data. In IDB Anlyzer, it is also possible to use all five PVs provided as one value, whereas in SPSS regressions should be calculated separately for each of the five PVs. When averaging the results using the five PVs generated in SPSS, an accurate or meaningful measure of the relationship is not achieved.

Before the regression was performed, the learner questionnaire data, reading literacy achievement data and the Quintile data were merged using SPSS and IDB Analyzer. The regression was then performed using this merged file. The Quintile was set as the independent variable or predictor (Field 2009), and the "1st to 5th PV: overall reading PV1" was identified as the outcome or dependent variable (Field 2009). The independent variable, or Quintile, was set as a dummy variable with five categories in which the category number corresponded to the Quintile number, as show in Table 5.2 (below). Category 1, is also the constant, to which all the other categories are compared.

Table 5.2: Dummy variable categories and the number of cases per Quintile

Category	Quintile	N
Constant (1)	1	3085
2	2	3587
3	3	4151
4	4	2564
5	5	1474
(Total)		(14861)

5.4.1 Linear regression analysis results

Table 5.3 provides results for each of the Quintiles in South African. The constant indicated provides South African Grade 4 readers in Quintile 1 with an average reading achievement score of 418.16 (SE = 7.50%) for this model. All other coefficients provided in Table 5.3 are interpreted relative to the constant. Every one point increase or decrease in coefficients, or independent variables, is relative to the constant, or dependent variable, which refers to average reading achievement for each of the Quintiles.

Table 5.3: Regression coefficient showing the reading literacy achievement differences between Quintiles

	Regression Coefficient	SE	t-value
Constant (Quintile 1)	418.16	7.50	55.72
Quintile 2	4.22	9.32	.45
Quintile 3	27.64	12.03	2.30*
Quintile 4	72.18	15.93	4.53**
Quintile 5	141.86	14.66	9.67**

* Significant at 0.05%

** Significant at 0.01%

Table 5.3 (above) shows the reading literacy achievement of each Quintile in the prePIRLS 2011 test, as compared to Quintile 1, which in this case is the constant. It can be expected that Quintile 2 schools would achieve only 4.22 (SE = 9.32) more points than Quintile 1. According to the t-value of 0.45, this difference is not statistically significant since it converts to a p-value larger than 0.05%. Table 5.3 graphically shows the small and statistically insignificant difference between the reading literacy results of Quintiles 1 and 2.

Statistically significant difference are however found between Quintiles 1 and 3, 4 and 5, according to Table 5.3. Quintile 3 learners can be expected to achieve 27.64 (SE = 12.03) more points than Quintile 1 with statistical differences between Quintile 1 and 3 at the 0.05 level. Quintile 4 learners are expected to achieve 72.18 (SE = 15.93) more points on the reading literacy test than Quintile 1.

Quintile 5 has the highest expected reading literacy score with 141.86 (SE = 14.66) more than Quintile 1. Statistically significant differences are found between Quintiles 1 and 4, and Quintiles 1 and 5, at the 99% confidence interval.

In order to understand the relationship between Quintile and reading achievement, the R-square is examined. According to Field (2009), "R-square represents the amount of variance in the outcome explained by the model relative to how much variation there was to explain in the first place".

Table 5.4: Percentage of variance explained

Country	R-square	R-square (SE)	Adjusted R-square	Adjusted R-square (SE)
South Africa	.26	.04	.26	.04

Table 5.4 (above) shows that the Quintile in which a school is placed accounts for 26% (SE = 0.4) of the variation in reading literacy achievement. This essentially means more than a quarter of the difference in achievement is explained by the Quintile assigned to a school and non-personnel expenditure afforded to the school based on the Quintile categorisation.

5.5. SUMMARY OF RESULTS

The largest system examined in this study is the exosystem, which is made up of the community. The area descriptions of the school in the different Quintiles were in line with what was expected: Quintiles 1 and 2 schools had the highest proportions of rural schools, whereas Quintiles 4 and 5 were mostly suburban. The economic situations of the communities as estimated by the principals in the school questionnaires generally seemed to be low with only Quintile 5 having a

much larger proportion reported as having a medium income. When schools were asked to report on the disadvantage and affluence of the families of the learners attending the school no obvious pattern was found. Quintile 3 did report the highest level of disadvantage and Quintile 4 reported the most affluence. No conclusive pattern was found with regard to non-economic resources such as parental help or teacher-aides being available.

At the mesosystem level, no consistent pattern was found. The only classroom resource examined that followed the expected pattern was the prevalence of libraries in the classroom, with Quintile 1 having the lowest reported percentage, and Quintile 5 the most. Concerning the remaining items, Quintiles 2, 3 or 4 reported the most need or the most severe problems in some items, contrary to expectation. There were also items in which Quintile 3 reported affluence, for example, only Quintile 3 schools reported having as many as 200 or more computers available to Grade 4 learners. The lack of obvious patterns indicates that resource availability does not necessarily increase with Quintile, rather that resource distribution is uneven. Despite a lack of a clear pattern, generally schools in Quintile 5 report the least need.

At the microsystem level, the attendance of preschool, parental education and occupation and home resources were examined. Both parental education and parental occupation show that the higher the Quintile the higher the percentage of higher paying jobs and the higher percentage of education. Quintiles 1 and 2 had very similar profiles, regarding parental occupation. The resource availability shows a slightly similar pattern, with Quintiles 1 or 2 the lowest, followed by Quintiles 3 or 4 and Quintile 5 showing the highest amount of available resources. Preschool attendance was contrary to expectation, with Quintile 2 having the lowest percentage of learners who attended preschool for three years. Quintiles 1 and 3 had the highest percentage of learners who had not attended preschool at all.

The pattern that emerges for the individual level items analysed, points to Quintile 2 being the neediest since this Quintile shows the lowest percentage of access to computers at home and at school, as well as the lowest percentage of learners who borrowed library books.

The results of the simple linear regression show no statistically significant differences between Quintiles 1 and 2 reading achievement, but some statistically significant relationships between Quintiles 1, 3, 4 and 5. Based on the R-squared value, 26% of the variance in reading literacy achievement can be explained by the Quintile of the school that the learner attends.

The implication of these results will be discussed in Chapter 6.

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

The purpose of this study was to explore the functionality and relevance of the Quintile system used to distribute funds to schools in South Africa. The implication of an improved funding system would be the distribution of funds in such a way that learners with the most need receive the most funds and ultimately for funds to be appropriated accordingly. This would ensure poorer learners received quality education in an attempt to obtain opportunities equivalent to those of more affluent learners. The aim of this study is to examine the Quintile education funding system, in terms of the Socio-Economic Status (SES) and reading achievement within each of the Quintiles and consider the argument for the use of a five-tiered system of funding.

South Africa appears to have made progress concerning education access, and according to Hill, Baxen, Craig and Namakula (2012) the government has almost reached the goal of universal basic education access (Hill et al., 2012). However, this success has been diminished due to the low quality of some of the education (Sayed & Motala, 2012c), evident in the low achievement of learners in international studies such as prePIRLS 2011 (Howie et al., 2012). High quality education for every child is an essential step in bridging the gap between the economically disadvantaged and affluent groups, and may smooth over other social inequity, such as the “great inequalities in the distribution of wealth amongst racially defined groups” (Smith, 2011). The purpose of striving for quality education for every learner was outlined in Chapter 1 and discussed extensively in the literature review (Chapter 3).

Studies such as those conducted by Bayat, Louw and Rena (2014) and Yang-Hansen (2008) have made causal associations with educational achievement as a product of SES. The implication is that learners from affluent families usually receive a more expensive and higher quality education, and are therefore more likely to succeed at tertiary level and obtain better paying jobs. The converse is then true for economically disadvantaged families. Because of the links between SES and educational achievement an uneven distribution of non-personnel funding for schools in South Africa was conceived as a means to achieve equality

(Fiske & Ladd, 2004b). A tiered system would allow for the most funds to be directed towards the neediest learners. Schools were assigned Quintiles based on the national poverty table compiled by the Treasury, using household income data (Dieltiens & Motala, 2014), with the neediest schools categorised as Quintile 1 and the most affluent as Quintile 5. The original distribution of funds, as well as a more recent division of them, is shown in Table 6.1, as presented in Chapter 3.

Table 6.1: Allocation of funds for the 5 Quintiles in 2007 and 2014

	Original division (2007) (%)	Current division (2014) (%)	Difference
Quintile 1	30	27.2	-2.8%
Quintile 2	27.5	27.2	-0.3%
Quintile 3	22.5	27.2	4.5%
Quintile 4	15	13.8	-1.2%
Quintile 5	5	4.6	-0.4%
Total	100	100	

Table 6.1 shows that Quintile 1 received as much as 30% of non-personnel funds and Quintile 5 as little as 5% of funds in 2007. Theoretically, the solution of tiered spending seemed sound, but in practice the success has been debatable. In 2014, the distribution had changed significantly to accommodate the ruling that all Quintiles 1, 2 and 3 schools would be made no-fee schools (Department of Basic Education, 2013b; Mestry & Ndhlovu, 2014). The percentage of funding to all Quintiles had to be decreased, (except for Quintile 3 schools) because of this decision, so that more funds could be redirected towards the middle Quintile.

An optimally functioning funding system would improve the chances of achieving the educational goals of “quality, equity and redress” (Department of Education,

1998, 2006). Because of the irregular quality of education and the changes made to the Quintile funding system since its inception, this study aimed to gauge the functionality and relevance of the system for education. The study made use of the Grade 4 preProgress in International Reading Literacy Study (prePIRLS) 2011 reading literacy achievement as well as the background questionnaire data obtained during the prePIRLS 2011 study.

This concluding Chapter summarises the following:

- The summary of the research approach
- The main findings of this study
- Reflections on the conceptual framework
- Methodological reflections
- Strengths and limitations of the study
- Conclusions and Recommendations.

6.1. SUMMARY OF THE RESEARCH APPROACH

This study aimed to investigate the appropriateness of the Quintile system for South Africa in ensuring access, equity and redress. By describing and comparing background data and reading achievement results from the prePIRLS 2011 study, the Quintile profiles as derived from SES items across the prePIRLS 2011 questionnaires and differences in reading achievement between the Quintiles were examined in order to justify or negate the use of a five-tiered system. The following main research question and sub-research questions have guided this study:

What are the implications of the evidence from prePIRLS 2011 for the use of a Quintile system in South Africa?

1) How can the Quintiles be described based on the SES indicators from prePIRLS 2011?
2) What are the statistically significant differences in reading achievement between the Quintiles?

3) Given the differentiation in achievement, to what extent is the Quintile system justified in reducing inequalities along SES lines?

By investigating these questions, using prePIRLS 2011 data, conclusions about the quality of the education system and the relationship between the achievement and Quintile have been established. These help to make policy recommendations and have led to further research questions to be investigated for better understanding of achievement in education in South Africa.

Since education quality and the appropriateness of the Quintiles are not directly measurable, variables were identified from the prePIRLS 2011 background and achievement data, then used as proxies as discussed in Chapter 2 and 3. Firstly, reading achievement was used as a proxy for education quality since the better the quality of education the higher the achievement of learners within the Quintile. Since Quintiles are based on SES factors such as income and parental education level, relevant SES variables from the prePIRLS 2011 background questionnaires (completed by learners, parents, teachers and principals) were selected in order to describe the nature of SES in each of the Quintiles. These descriptions assisted in establishing the need or level of economic disadvantage to verify if Quintile 1 schools were actually the neediest and Quintile 5 the least needy.

The post-positivist paradigm informs this study, since objective reality is acknowledged, but because knowledge is socially constructed this objective reality may not necessarily be obtained. SES is one such socially constructed concept with its effects seen in the reality of poverty and inequality in South Africa. Post-positivism also allows for the use of pure quantitative research, such as that of reading literacy scores as well as acknowledging the society within which the research is conducted, in this case, making use of background data collected by background questionnaires.

6.1.1 Data Source

This study took the form of a quantitative secondary analysis using the South African prePIRLS 2011 survey and reading literacy test data. A sample of 15,744 learners, from 345 schools, were drawn from the population of Grade 4 learners in South Africa (Howie et al., 2012). This sample was taken from all nine provinces

and stratified according to language, since South Africa has 11 official languages. The data was obtained directly from the International Association for the Evaluation of Educational Achievement (IEA) website, that is, the organisation that conducts the prePIRLS, PIRLS, TIMSS and other large-scale international studies, and takes the form of reading literacy test scores, in the form of PVs, and the questionnaire data. The school principal, teachers, parents and learners completed questionnaires to establish background details related to reading literacy. A complete discussion of the PVs and how they were established is discussed in Chapter 4.

6.1.2 Data preparation

Since the Quintiles of the schools were not provided during the prePIRLS 2011 study this information was obtained from the Department of Basic Education (DBE). The Quintile information was then entered into the prePIRLS 2011 Statistical Package for the Social Sciences (SPSS) data files, which were then merged using IDB Analyzer – an SPSS plugin created by the IEA for the use of processing large-scale, weighted data. The data preparation was extensively explained in Chapter 4.

During the data preparation phase the background questionnaires were also examined and the appropriate variables that could be used to describe SES were selected. By focussing on SES-relevant variables, descriptions of Quintiles were based on only these variables, also allowing for a clearer picture of the SES-conditions experienced by learners, teachers, principals and schools in each Quintile. A table of these variables can be found in Appendices A - D.

6.1.3 Data processing

In order to answer the first sub-question, IDB Analyzer was used to generate descriptive statistics regarding the selected variables from the background questionnaires. The results were given as percentages, for example, of parents who had achieved certain levels of education. These percentages were

disaggregated by Quintile, so as to use the information to describe the Quintiles during the analysis phase. When variables measured similar constructs, Cronbach's alpha was provided as a measure of reliability.

In order to answer the second sub-research question, a simple logistic regression was performed using IDB Analyzer. Quintile 1 was set as the constant, which meant that all the differences between achievements for each of the Quintiles were compared to Quintile 1. The first and the second research question informed the third and therefore the overall research question of the study. The results of the descriptive statistics and logistic regression were detailed in Chapter 5, using graphs and tables to illustrate the findings.

6.2. MAIN FINDINGS

The sub-questions will be discussed first in an effort to discover the findings of the main research question.

6.2.1 Description of the Quintiles based on the SES indicators from prePIRLS 2011?

The overall findings to this question are discussed by examining the reading literacy achievement results as well as the background questionnaire survey data relating to SES. These summary findings are extracted from the in-depth discussion in Chapter 5.

Quintile 1 schools achieved a possible prePIRLS 2011 reading literacy test score of 418.2 (SE = 7.5) points, well below the international centre point of 500. It is interesting to note though, that according to the theoretical basis of the Quintile system, Quintile 1 should (explicitly) show the most need, but this was not always clearly the case. An example to illustrate this finding would be that Quintile 2 schools reported that their ability to provide quality education is severely hampered by shortage of buildings and school grounds, whereas Quintile 1 schools do not report the severity to such an extent.

Quintile 2 schools achieved a possible prePIRLS 2011 reading literacy test score of 422.4 (SE = 5.8). Again, this is below the international centre point. The general impression gained from the examination of SES items is that there is a large amount of need reported for schools in Quintile 2, a finding that was not unexpected since the government had allocated the same non-personnel funding to Quintiles 1 and 2.

In terms of location, Quintile 1 and 2 school are similar, since over 70% of schools from the prePIRLS 2011 sample were found in remote rural areas. Although the authors suggest that the poorest 20% are mostly rural and farm schools (Maringe & Prew, 2014), this study suggests the percentage might be a conservative estimate. From principals' reports, Quintile 1 schools reported the highest levels of low income whereas principals from Quintiles 2, 3 and 4 all reported prevalence of low income, between 75% and 85%. Quintiles 1 and 2 principals' reports revealed the highest percentages of schools without libraries. Regarding the availability of magazines, principals from Quintile 2 schools reported the highest percentage with between 0 and 10 magazine titles. Between 30-40% of Quintile 1 and 2 schools had between 1 and 50 computers available for learners to use. The highest percentage of Quintile 2 schools had teachers reporting that their capability to provide a good education to learners was hampered by lack of school buildings and grounds, heating, cooling and lighting systems, technologically competent staff and computers for instruction. Quintile 1 teachers, however, only reported high percentages for lack of supplies that severely affected their ability to provide quality education. "Basic school facilities play an important role in student achievement" (Heaton, Amoateng, & Dufur, 2014, p. 106) and the lack of facilities reported help explain low reading literacy achievement in the lower Quintile schools.

Quintile 3 schools also receive the same amount of non-personnel funding, which implies the same amount of need as Quintiles 1 and 2. This however was not the case, as evident in prePIRLS 2011 data. Although teachers of Grade 4 learners from Quintile 3 schools reported the highest percentage of lack of instructional materials and instructional space the learners seemed more privileged than those from Quintiles 1 and 2 schools in the majority of the items examined in this study.

An example of this would be the availability of computers, with as many as 200 computers available to learners, and less than 40% of schools having none. Quintile 3's reading achievement for prePIRLS 2011 was also higher than that for the two lower Quintiles, with an overall score of 445.8 (SE = 8.4).

The variables relating to the percentage of learners in the school from economically affluent and economically disadvantaged homes showed that school principals from Quintile 3 schools reported the highest need here. This variable could point either to a tendency for principals to exaggerate the need in order to encourage more funding towards Quintile 3 schools, or to the schools in these poor areas having been defectively classified. Examining the variable concerning the availability of teacher aides in the classroom, teachers of Grade 4 learners from Quintile 3 schools also reported the highest percentage of teacher aides being always available. Quintile 3 schools had the second lowest reported percentage of schools without libraries at 53.26% (SE = 8.15). These schools also reported the highest percentage of overcrowded classrooms as a serious problem (47.6%, SE = 8.1). On the other hand, schools in this Quintile reported the second highest percentage of access to the Internet. From these results no clear pattern has emerged.

Quintile 4 and 5 schools were typically found in suburban areas but the classification of income levels in the communities was different. A large number of principals considered the average income of the Quintile 4 schools' immediate area to have a larger prevalence of low income earners than Quintile 5. The availability of a library in Quintile 5 was the highest, as expected, whereas principals from Quintile 4 schools reported a lower access to a library than Quintile 3. Almost 80% of Quintile 5 schools had between 1 and 50 computers for learners to use. Another variable in which Quintile 4 schools showed substantial disadvantages was reported by 35% of teachers of Grade 4 learners in Quintile 4 schools, with buildings in need of repair a serious problem. Another variable with a large difference between Quintiles 4 and 5 schools was Internet accessibility, with just over 50% of Quintile 4 schools having access compared to over 95% of Quintile 5 schools.

Among the variables to which the responses reflected the expected Quintile pattern was that of highest parental qualification and parental occupation. Grade 4 learners in Quintile 1 mostly had parents with low qualifications and either no occupation or worked as unschooled labourers. Quintiles 1 and 2 were however similar in parental occupation. That a higher education and 'better' employment would translate in a higher income could explain more resources available to children and may improve test results. The availability of resources, such as learners having their own room and desk in the home, generally showed the expected pattern, except for occasional inversions between Quintiles 1 and 2.

Quintile 4 schools, from the prePIRLS 2011 sample, achieved a possible reading literacy score of 490.3 (SE = 13.5). Although it is still below the international centre point of 500 it is closer to this benchmark than the previous three Quintiles. The reported need in Quintile 4 was less prevalent than the previous three Quintiles. In general, Quintile 4 schools reported greater need than Quintile 3 and less than Quintile 5. Schools from Quintile 5 achieved the highest expected reading literacy score of 560 (SE = 12.5), which is the only Quintile higher than the international centre point. Although achievement in prePIRLS 2011 was satisfactory for Quintile 5 schools, it is expected that achievement would still be low for PIRLS 2011, a considerably more difficult assessment.

Using reading literacy achievement as a proxy for quality, results from the current study confirm that Quintile 5 schools received the highest quality of education. Quintile 5 also reflects the highest SES of all the Quintiles, with less need reported than in the other Quintiles. Schools in Quintile 5 exhibited more affluence than those in the lower four Quintiles.

6.2.2 Evidence of the statistically significant differences in reading achievement between the Quintiles

A simple logistic regression was performed using the data that had been merged to contain the Quintile and reading achievement scores. Chapter 4 described the steps taken to prepare and process this data, in more detail. The results, made known in Chapter 5, show that there were no statistically significant reading

achievement differences between schools from Quintiles 1 and 2. Since both Quintiles were part of the no-fee schools sector it is not surprising that their reading achievement would be similar. The schools from the bottom two Quintiles also received the same amount of funding per learner, according to the *Government Notice 166* from 2014 (Department of Basic Education, 2013b).

A statistically significant difference ($p < 0.05$) is obtained when comparing Quintiles 1 and Quintile 3. Similarly to Quintiles 1 and 2, Quintile 3 schools were also no-fee paying schools and received the same amounts of non-personnel funding per learner in the school (Department of Basic Education, 2013b). However, a higher reading literacy achievement of 27.64 (SE = 12.03) can be expected in Quintile 3 when compared to the previous two Quintiles, possibly due to higher SES.

Both Quintiles 4 and 5 schools could be expected to achieve higher results than the previous Quintiles, ($p < 0.01$). The reading literacy achievement of schools in Quintile 4 could be expected to be 72.18 points (SE = 15.63) higher than Quintile 1 achievement. Reading literacy achievement of schools in Quintile 5 is expected to be 141.86 (SE = 14.66) higher than Quintile 1. Both Quintiles 4 and 5 contained schools that charge fees and received a small portion of government funding (as seen in Table 6.1). Quintile 4 schools did however receive a larger percentage of funds than those in Quintile 5.

Although both the highest Quintiles show such a convincing increase in achievement the difference between Quintiles 1 and 5 and 1 and 4 is almost double in score points. Quintile 5 learners outperformed those in all other Quintiles by a large margin. Many Quintile 5 schools in the prePIRLS 2011 study were former Model-C schools, that is, schools in the previous education system in which parents assumed responsibility for paying fees as well as employing more teachers (Holley, 2009). Their infrastructure, although not necessarily well maintained, was present and functional, without even considering non-personnel funding (Maringe & Prew, 2014). The presence of school resources and infrastructure, such as libraries and school buildings, is associated with higher achievement, as confirmed by Heaton, Amoateng and Dufur (2014).

In Chapter 5, the r-square result for the difference between reading literacy achievement by Quintile indicated that Quintile allocation in the national system accounts for 26% of the reading literacy achievement. Cyril Ramaphosa said that “reading (is) essential for freedom and a better future” (South African Press Association, 2015), indicating that members of the government recognised the crippling effect that illiteracy has for citizens. The concern with low performing poor schools is that learners who pass through these institutions have fewer opportunities to become financially successful than those from schools that have better quality education, as seen from the differences in reading achievement scores as measured by prePIRLS 2011.

6.2.3 Justification for the Quintile system in reducing inequalities along SES lines

The differentiation in achievement is addressed in sub-question 2 and shows that Quintiles 1 and 2 did not differ statistically significantly in reading literacy achievement whereas comparisons between the other Quintiles did. The discussion that follows examines what this differentiation means in terms of supporting or negating both a tiered system of spending and, more specifically, the Quintile system.

As deduced from the literature review (Chapter 3), there seems to be little official justification for choosing a specifically five-tiered funding system. The seemingly arbitrary nature of the decision to use five tiers in the funding system allows for speculation about the motivation for this Quintile system and the research conducted before its implementation. The motivation for a tiered system, however, is clear since through redistribution of funds, discrepancies in educational opportunities might be addressed. The DoE specifically implemented a funding policy that would allocate more funds to needier people in order for the prudent goals of “redress, equity and quality” (Department of Education, 2006) to be achieved.

Some research suggests more input of non-personnel funding will translate to higher quality education whereas others criticise these studies. Researchers such as Heaton et al. (2014) acknowledge that there are differences between the

western world and the developing world. However, the availability of literature relating reading literacy achievement, and financial input in developing countries such as South Africa, is inefficient and inconclusive (Pellicer & Piraino, 2015). There do seem to be similar patterns that show more funding generally translates to better education achievement and that school quality is often dependent on resources (Heaton et al., 2014). Taylor makes the argument that poor achievement may be a product of ineffective school management as well as economic factors (Taylor, 2011). The implication is that with poor management practices schools may still be ineffective, even with more financial resources made available to them.

Pellicer and Piraino (2015) explain that school outputs are results of "management and incentive structures" as well as resources and funding. Although this study does not directly measure management and incentives structure variables, aspects other than funding are highlighted. It is not only important to make resources available but the use and management of these is important. Teachers of Grade 4 learners from Quintile 1 schools reported that almost 50% of learners use computers every day at school. This percentage achieves steadily lower compared to Quintile 5, in which less than 30% of learners used computers every day at school. Teachers of Grade 4 learners from Quintile 2 schools reported the highest percentage of never using a computer, with 38.4% (SE= 4.3). The relevance of this variable may firstly lie in how these computers were being used. Secondly, resources such as computers should be used to enhance education, and since Quintile 1 schools achieved the lowest scores, and questions have been raised concerning the quality of education, perhaps computers could be used in a more constructive and enhancing way.

Spaull (2013b) discusses the presence of two education systems in South Africa; a poor quality, underachieving and underprivileged one and the other made up of "well-resourced … mainly former White and Indian schools, and small but growing private schools" (Frempong, Reddy, & Kanjee, 2011). These two tiers can also be thought of as no-fee paying and fee paying schools (Maringe & Prew, 2014). The results from this study, although acknowledging two extremes, of Quintile 1 and 2 and Quintile 5, do not corroborate the idea of only two groups. Based solely on

reading literacy achievement, there are four groups present with statistically significant differences between their expected reading achievements as measured by prePIRLS 2011, i.e. the group containing Quintile 1 and 2; and the three groups represented by the remaining three Quintiles. Again, it should be noted that reading literacy achievement has been used as a proxy for quality. In other words, Quintiles 1 and 2 seem to have poorer quality education than Quintiles 3, 4 and 5 schools in the prePIRLS 2011 sample. Quintile 5 schools clearly have higher quality education based on the reading literacy achievement of Grade 4 learners in prePIRLS 2011. It is then reasonable that Quintiles 1 and 2 schools should receive more funding in an effort to improve their achievement, assuming there is a direct causal link between increased funding and educational achievement.

One of the most challenging aspects of policy development is to assess and monitor the system to ensure its feasibility. The Quintile system was implemented in order to foster access, quality, equity and redress, in the South African education landscape. There is, however, concern about how the effectiveness of the system in achieving these goals is to be measured. The solution may lie in utilising results from large-scale international tests such as PIRLS and TIMSS more effectively. In addition, the Annual National Assessment (ANAs) could serve a better monitoring function. Begun in 2011 (Department of Basic Education, 2013a) and in 2014, every learner from Grades 1 to 9 was required to write language and numeracy tests (Maringe & Prew, 2014). Although many criticisms of the ANAs have been levelled, from mistakes in the tests to how they were marked and the interpretation of the results, these large-scale tests would still provide important benchmark data to compare results from year to year (Department of Basic Education, 2015). In 2015 however, chaos ensued between the DBE and unions which effectively saw the ANAs being postponed to February of 2016 (Nsele, 2015). These important steps South Africa was taking towards a measuring mechanism that could be used to test education quality seem to have been for nought with the impending possibility of the discontinuation of the tests.

Ensuring schools are in the correct grouping, be it Quintile or quartile, is another significant challenge when implementing a tiered system. The measurement of SES should be done correctly in order to reflect the actual disadvantage of

learners in schools so as to redirect sufficient funding to the correct learners. Currently the National Income Dynamics Study (NIDS) is used, but the actual determining factor of SES seems to only be the economic conditions of the family. A redefinition of SES should occur considering both the social and financial capital equally. Fukuyama defined social capital as “an instantiated informal norm that promotes co-operation between two or more individuals” (Fukuyama, 2001), and is thought to have economic benefits for those cooperative groups. The African concept of *uBuntu* could be seen as an informal norm promoting cooperation between people. One of the challenges regarding social capital, and possibly the reason it is often neglected in the concept of SES, is the absence of consensus regarding how it is measured (Fukuyama, 2001).

6.2.4 Implications of the evidence from prePIRLS 2011 for the use of a Quintile system in South Africa

The main question of this study sought to find evidence, from prePIRLS 2011, for the use of a Quintile system in South Africa. By answering the three sub-questions posed the main question can be discussed.

Based on the percentages reported as an answer to sub-question 1, it was found that schools in the prePIRLS 2011 sample from Quintiles 1 and 2 reported the most need, most often. Quintile 3 principals, teachers, parents and learners occasionally reported the most need but this happened with fewer variables than the two lower Quintiles. Schools from Quintiles 4 and 5 seemed to reflect the most affluence. Although it must be kept in mind that many of the items in the prePIRLS 2011 questionnaires were relatively subjective, the picture of SES in the Quintiles emerged as expected. The findings from this study seem to support the divisions into separate groups, based on the need in the areas but Quintiles 1 and 2 seem to have very little to differentiate them.

It is the goal of education funding to provide financial support in such a way that it is equal, however, by using reading literacy achievement as a proxy for education quality the education quality across the Quintiles was not equal and thus did not provide similar quality for learners. The role of funding should provide financial

support in such a way that quality education does not vary depending on the Quintile in which a school is categorised.

6.3. REFLECTIONS ON THE CONCEPTUAL FRAMEWORK

This section examines findings in relation to the conceptual framework.

6.3.1 Socio-Economic Status

At the outset of the study, the concept of Socio Economic Status (SES) was defined by combining factors such as parental education and household income. This conceptualisation was reflected in how schools were allocated to Quintiles. In this study, the concept of SES mainly focused on the availability of resources, which, while the only measure as obtained from prePIRLS 2011, could be enhanced with an indication of whether or not they were being used and with what effectiveness. However, understanding of the concept of SES, in general, is incomplete since the issues of economics outweigh the social issues. The definition of SES, as used in this study, falls short of the actual significance of SES in homes and the conceptualisation required to reflect the complexity thereof in people's lives.

According to Bourdieu (1986), who initially referred to 'social capital', there are different forms of capital, namely, economic, social and cultural. A suggestion would be to consider the social and cultural forms of capital along with economic capital when defining socio(cultural) economics. This conceptualisation could more accurately reflect not only the financial circumstance within which families operate, but also the cultural situation, such as the importance of investing time in oneself, and the social context, including the links and networks which improve an individual's situation. According to Fukuyama (2001), social capital is "important to the efficient functioning of modern economies, and is the sine qua non[7] of stable liberal democracy" (Fukuyama, 2001). It is therefore essential to reconceptualise SES and use a new, more balanced definition in education studies.

[7] An essential condition

6.3.2 The combined framework model

The conceptual framework for this study was created by combining Bronfenbrenner's ecological framework with the PIRLS Assessment Framework, which consisted of factors that influenced reading literacy and were classified into the differing levels, macro, meso, exo and micro. By combining these two models, Bronfenbrenner's model to explain the development of a child (Lewthwaite, 2011) based on the systems the child is part of, can be made more specific to the development, and thus achievement, in reading literacy. This model was used to classify the identified SES variables into different levels as well as to interpret the findings and implications for the systemic education challenges.

The following diagram illustrates the combined framework used in this study.

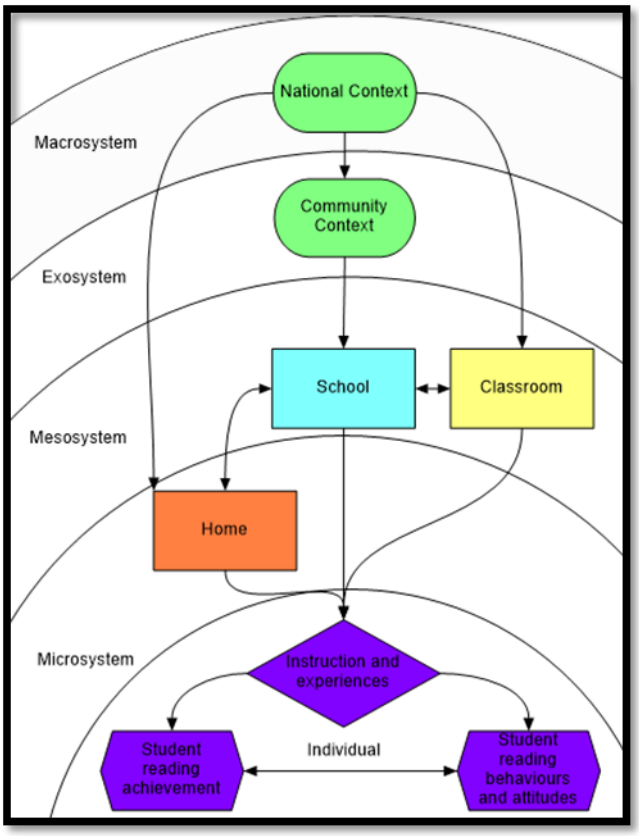


Figure 6: A nested prePIRLS 2011 Framework integrated with Bronfenbrenner's Bio-ecological Model

A linear system's theory may have also been appropriate for this study, since an analysis of the inputs, processes and outputs of the system may have yielded

interesting results. One such relevant model could be that of Creemers and Scheerens (1994), often used for school effectiveness research. This study focussed on the inputs such as the resources in each Quintile and the reading achievement as an output. However, an examination of the steps between the input and output stages may have helped explain the outputs, or in this case reading achievement, more holistically.

6.4. METHODOLOGICAL REFLECTIONS

This study took the form of a secondary data analysis of the prePIRLS 2011 reading literacy achievement data and the background questionnaire data.

South Africa has participated in a number of educational studies at the national, regional and international level. The Annual National Assessments (ANAs) were introduced in 2011 (Spaull, 2013a) and the results have been the focus of many debates among educational stakeholders. Although the DBE has praised the education system for improvements over the last few years, anecdotal evidence suggests this improvement is not a fair reflection of the educational achievement and thus quality in the education system. Due partly to this raw ANA data not being available to the public, as well as the questionable credibility thereof, a data set that was created independently of the DBE had to be considered for purposes of this study.

The prePIRLS 2011 data was not only collected independently but also had the benefit of being a data set that was large, sufficient in depth and highly credible. The availability of reading literacy achievement data was important as the value of literacy for opportunities is great (see Chapter 2). The background questionnaire data was also essential in the effort to describe the five Quintiles according to SES.

Some design issues are explained in the following section, concerning the limitation of the study, and should be kept in mind with the interpretation of results.

6.5. LIMITATIONS OF THE STUDY

A limitation of the use of prePIRLS 2011 data is that the study was conducted in 2011, thus if any items were unclear or might have needed follow-up information, this could not be obtained. Although it is not unusual to mine data for many years, the reading literacy achievement of more recent years, would provide even better insights that may hold more weight for policymaking.

As with all secondary analysis studies, it is a weakness that this researcher was not present at the data collection stage. The implication is that the researcher had no input in the study's design in South Africa and no opportunity to ask follow-up questions.

Certain follow-up information may have been useful in this study, with some 'subjective' classifications, for example, the variable which examines the level of income in an area and the options of high, medium and low. This type of question relies on a respondent's own conceptualisation of high, medium and low, and this may be different from that of other respondents.

6.6. CONCLUSIONS

The analysis of the South African education system in general seems insufficient, since the focus is on the inputs and outputs, with little regard for the processes. The country might benefit from a shift in focus, to the 'processing' section of the general system's theory model. Considering financial input is ineffective without considering how the finances are used. Improved 'processes' may include improving management structures, better accounting practices for recording the use and effectiveness of finances. More money could also be put towards effective and innovative teacher development, in an effort to improve quality education.

Decentralisation of responsibility seems to be to blame for a loss of control of many schools, regarding funding and appointing teachers and principals. The non-personnel funds allocated by Quintile do not seem to benefit the learners, if the funds reach the learners at all. Inconsistent accounting practices and

bookkeeping, reports of principals funnelling school fees into personal accounts, are easier to execute in a decentralised system. The decentralisation has created a space for teacher unions to exert considerable pressure and gain influence in the education process (Govender, 2015), beyond their mandate. Because of these inefficiencies in the system, money seems to not actually be reaching children or helping in class: even though the lower Quintiles receive the most money, their achievement and thus the quality, is still low. This pattern may either be due to the money not being used effectively or learners not reaping benefits from the money. The myriad of factors at play in the system should be kept in mind despite the study's focus on the Quintile system as a financially driven one. All these problems should be more closely monitored by government or external agencies to monitor and provide corrective feedback for the system.

6.6.1 Recommendations

Based on the first research sub-question, further research should be conducted in order to build on a study such as this. Firstly, the study of SES would be greatly improved with a more holistic conceptualisation of the term. This could in turn be used to build an SES index from the PIRLS Background Questionnaires. A longitudinal study, using multiple prePIRLS data points for South Africa could provide extended information for policymakers.

The second research sub-question, relating to the statistically significant differences in reading achievement between the Quintiles, suggests that Quintiles 1 and 2 schools have similar reading achievement. This may be related to the low SES of the Quintiles and may point to similar quality education in those schools. The recommendation based on this data is that South Africa could benefit from a new approach to a tiered funding system. The data used for school classification should be more current and updated on a regular basis to keep up with natural migration and changes in community SES. Another recommendation would be to take all the SES data available from various large scale studies and analyse it to see if natural groupings form. Funding can then be allocated and divided according to these divisions. It is strongly recommended that each grouping receive different funds since the SES of each group will be different.

6.6.2 Main conclusion

While South Africa is putting a large percentage of GDP into education, the quality of education is not consistent across the Quintiles. In other words, although there is a large amount of financial input into the education system, the reading literacy achievement across Quintiles does not reflect equal quality.

The classification of schools into a tiered system appears to be justified since there are different levels of need reported in different schools. A tiered funding system seems to be the best way to redirect funds to learners in need. However, the division of this tiered system into five categories seems arbitrary. According to the results of this study, Quintiles 1 and 2 are similar and do not show statistically different reading literacy achievement scores.

The necessity for good quality education is undeniable in a country striving to balance out past injustices. Tiered funding attempts to even out SES discrepancies among South African learners and should continue to do so, albeit in a more effective way.

No other investment yields as great a return as the investment in education.

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APPENDICIES

8.1. Appendix A

Conceptual Framework		Questionnaire	Measurement Level	PrePIRLS 2011 Variables	Possible answer	Q1	Q2	Q3	Q4	Q5
Bronfenbrenner	PIRLS									
				How would you characterise each of the following within your school?						
Exosystem	Community	Teacher	Ordinal	e) Parental support for learner achievement	very high	7,35	8,13	7,76	8,65	2,37
					high	12,99	11,27	23,44	7,99	16,24
					medium	27,44	44,09	36,87	32,81	56,53
					low	40,39	35,7	25,12	30,95	16,78
					very low	11,83	0,8	6,81	19,61	8,09
				f) Parental involvement in school activities	very high	12,32	4,56	1,49	0,6	4,31
					high	9,71	16,57	23,57	13,69	15,34
					medium	31,26	47,78	46,29	37,85	44,49
					low	36,92	23,35	22,45	28,59	27,73
					very low	9,76	7,74	6,2	19,28	8,14
				Are the following resources available to you to work with learners who have difficulty with reading?						
		Teacher	Ordinal	a) a specialised professional (e.g. reading specialist, speech therapist	Always	2,24	3,66		9,28	11,15
					Sometimes	9,85	9,36	27,34	15,48	22,73
					Never	87,91	86,98	72,66	75,24	66,12
				b) a teacher-aide	Always	4,14	15,18	34,52	17,07	17,62
					Sometimes	30,9	26,21	19,99	23,44	17,33
					Never	64,96	58,61	45,5	59,49	65,05
				c) an adult/parent volunteer	Always	1,87	5,7	0,86	7,42	4,15
					Sometimes	17,05	17,4	16,61	9,87	25,01
					Never	81,08	76,9	82,53	82,72	70,84

		Approximately what percentage of learners in your school have the following backgrounds?						
School	Interval	a) come from economically disadvantaged homes	0-10%	6,8	6,14	0,49	0,78	15,53
			11-25%	2,54	1,35	0,71	11,51	25,31
			26-50%	11,31	13,51	13,17	25,7	14,95
			More than 50%	79,36	79	85,63	62,01	44,21
		b) come from economically affluent homes	0-10%	63,89	58,51	80,34	66,11	48,5
			11-25%	13,49	29,62	13,9	21,31	13,2
			26-50%	13,4	8,65	0,67	10,11	21,8
			More than 50%	9,13	3,21	5,09	20,47	13,46
School	Ordinal	Which best describes the immediate area in which your school is located?	Urban	0	0	2,77	19,39	18,89
			Suburban	11,13	11,39	26,32	60,73	66,46
			Medium size city	0	0	4,6	3,6	9,5
			Small town	16,1	15,85	27,68	15,36	4,86
			Remote rural	72,77	72,77	38,63	0,92	0,29
School	Ordinal	Which characterises the average income level of the school's immediate area?	High	0	0,29	0	0,78	2,28
			Medium	10,2	19,29	16,76	20,39	55,48
			Low	89,8	80,42	83,24	78,83	42,24

8.2. Appendix B

Conceptual Framework		Questionnaire	Measurement Level	PrePIRLS 2011 Variables	Possible answer	Q1	Q2	Q3	Q4	Q5
Bronfenbrenner	PIRLS									
				In your current school, how severe is each problem?						
Meso	School	Teacher	Ordinal	a) The school building need significant repair	not a problem	14,17	17,99	10,24	12,36	23,2
					minor problem	30,02	36,39	53,18	34,14	42,87
					moderate	26,41	12,13	20,95	18,37	19,69
					serious problem	29,4	33,49	15,62	35,13	14,24
				b) Classrooms are overcrowded	not a problem	23,53	10,05	18	3,65	30,83
					minor problem	12,18	25,08	9,41	28,67	24,76
					moderate	25,11	26,48	25	26,37	19,94
					serious problem	39,18	38,38	47,59	41,31	24,47
		School	Interval	What is the total number of computers that can be used for instructional purposes by Grade 4 learners?	0	59,54	65,71	36,83	41,74	23,06
					1-50	40,33	30,3	54,17	53,84	76,94
					51-100	0,13	3,87	5,39	4,42	0
					101-150	0	0	3,28	0	0
					151-200	0	0	0	0	0
					201+	0	0	0,33	0	0
		School	Nominal	Does your school have a science laboratory that can be used by Grade 4 learners?	Yes	1,2	1,37	8,6	6,9	31,37
					No	98,58	98,63	91,4	93,4	68,63
		School	Nominal	Does your school have a library?	Yes	19,95	31,93	46,74	35,92	77,27
					No	80,05	68,07	53,26	64,08	22,73

			Ordinal	A. If yes, approximately how many books with different titles does your school library have (exclude magazines and periodicals)?	School Library with more than 5000 books	0,42	1,11	0	1,67	28,06
					school library with 501 - 5000 books	6,72	7,43	14,73	15,46	35,46
					School library with 500 books or less	11,39	22,78	32	18,79	13,23
					No school library	81,46	68,68	53,26	64,08	23,24
			Ordinal	B. Approximately how many titles of magazines and other periodicals does your school library have?	0	32,29	57,14	33,75	26,47	16,26
					1-5	39,76	6,81	27,6	41,26	34,05
					6-10	14,63	2,34	20,32	3,23	16,15
					11-30	4,48	22,24	9,77	19,9	15,02
					31 or more	8,84	11,47	8,56	9,13	18,52
				How much is your school's capacity to provide instruction affected by a shortage or inadequacy of the following?						
				General School Resources						
			Ordinal	a) instructional materials (e.g. textbooks)	Not at all	11,07	16,8	10,72	13,77	46,13
					A little	20,74	28,93	24,39	35,41	24,96
					Some	48,54	37,51	41,5	36,16	18,81
					A lot	19,65	16,76	23,38	14,66	10,1
				b) supplies (e.g. papers, pencils)	Not at all	20,85	38,15	28,44	23,88	53,89
					A little	15,97	13,87	10,11	45,36	17,97
					Some	28,24	14,82	32,6	17,78	11,54
					A lot	34,93	33,17	28,86	12,97	16,6
				c) school buildings and grounds	Not at all	11,49	9,52	5,08	18,8	47,49
					A little	37,83	32,43	33,19	40,85	26,72
					Some	36,54	28,71	39,63	17,14	8,67

					A lot	14,13	29,34	22,11	23,21	17,11
					Not at all	26,49	13,3	21,85	17,99	42,22
				d) heating/cooling and lighting systems	A little	29,79	36,79	33,55	36,09	23,47
					Some	31,69	22,42	27,14	27,94	21,11
					A lot	12,03	27,47	17,47	17,98	13,2
					Not at all	12,84	13,53	5,06	9,19	27,85
				e) instructional space (e.g. classrooms)	A little	23,95	29,56	17,7	40,89	39,43
					Some	50,36	34,66	53,16	33,32	11,56
					A lot	12,85	22,25	24,08	16,6	21,16
					Not at all	15,75	17,21	11,43	9,25	21,69
				f) technologically competent staff	A little	42	35,88	41,85	55,55	44
					Some	31,01	17,82	31,13	20,83	24,83
					A lot	11,24	29,1	15,59	14,36	9,49
					Not at all	44,85	32,16	34,97	28,05	25,73
				g) computers for instruction	A little	18,89	16,94	26,19	26,09	27,6
					Some	10,02	10,4	19,46	13,17	13,25
					A lot	26,23	40,5	19,39	32,69	33,42
				Resources for reading instruction						
					Not at all	32,29	18,34	32,92	26,2	23,17
				a) teachers with a specialisation in reading	A little	23,46	31,61	19,11	16,48	35,52
					Some	18,17	25,87	32,83	44,46	31,34
					A lot	18,55	24,18	15,14	12,85	9,98
Meso	School	School	Ordinal		Not at all	60,89	43,47	48,71	33,43	1,97
				b) computer software for reading instruction	A little	4,84	12,91	18,99	21	12,68
					Some	8,09	3,94	6,36	14,53	29,78
					A lot	26,18	39,67	25,94	31,03	37,57
					Not at all	43,98	23,08	26,77	12,51	31,97
				c) library books	A little	21,82	31,1	32,19	25,57	19,49
					Some	14,57	12,22	21,22	30,99	21,75
					A lot	19,63	33,6	19,83	30,62	26,8

			d) audio-visual resources for reading instruction	Not at all	48,87	36,65	48,56	36,34	22,98
				A little	14,08	16,83	14,1	13,64	17,17
				Some	12,28	5,83	9,56	7,65	22,14
				A lot	24,78	40,68	27,78	42,37	37,71
			How often does your school ask parents to do the following?						
			a) volunteer for school projects, programmes, and trips	Never	5,75	8,08	3,99	7,47	4,5
				Once a year	25,49	24,54	37,2	32,17	20,87
				2-3 times a year	33,79	36,71	35,53	19,35	35,36
	School	Ordinal		more than 3 times a year	34,98	30,66	23,29	41,01	39,26
			b) serve on school committees (e.g. school governing body, parent-teacher association	Never	1,41	0,4	1,36	6,48	
				Once a year	27,98	22,82	27,47	25,29	43,06
				2-3 times a year	24,65	22,06	20,94	18,08	27,36
				more than 3 times a year	45,96	54,72	50,23	50,15	29,58
			In your view, to what extent do the following limit how you teach this class?						
			b) Learners suffering from lack of basic nutrition	Not Applicable	21	14,79	10,3	8,44	18,1
				Not at all	27,55	18,63	10,94	17,16	24,48
				Some	35,11	55,95	61,32	56,07	44,83
				A lot	16,34	10,63	17,45	18,34	12,59
Classroom	Teacher	Ordinal	c) Learners suffering from not enough sleep	Not Applicable	26,36	9,5	12,52	12,52	25,29
				Not at all	38,63	40,57	18,72	12,88	26,82
				Some	32,98	46,08	68,23	64,24	33,95
				A lot	2,03	3,85	0,53	10,36	13,94
			d) Learners with special needs (e.g. physical disabilities, mental or emotional/psychol	Not Applicable	29,11	20,61	10,62	20,4	5,87
				Not at all	11,94	17,86	11,88	0,34	15,6
				Some	53,86	50,05	64,02	51,7	54,97

		ogical impairment, learning disabilities)	A lot	5,09	11,47	13,48	27,55	23,56
Teacher	Ordinal	Is there any provision for advanced readers to receive additional or more challenging reading instruction in your school?	Yes	60,35	70,63	81,84	52,78	61,35
			No	39,65	29,37	18,16	47,22	38,65
		When you have reading instruction and/or do reading activities with the learners, how often do you use the following resources?						
Teacher	Ordinal	a) Textbooks	Basis for instruction	68,03	60,14	67,07	52,91	52,61
			Supplement	31,97	36,76	32,41	47,09	45,58
			Not used		0,1	0,52		1,81
		b) reading series (e.g. basal readers, graded readers)	Basis for instruction	33,06	29,35	54,97	55,83	43,24
			Supplement	59,87	62,37	43,29	29,63	43,56
			Not used	7,07	8,28	1,74	14,53	13,2
		c) workbooks or worksheets	Basis for instruction	54,19	48,09	73,49	81,56	62,17
			Supplement	39,07	42,32	25,8	18,19	36,98
			Not used	6,74	9,59	0,72	0,24	0,85
		d) a variety of children's books (e.g. novels, collections of stories, non-fiction)	Basis for instruction	21,57	24,83	33,83	18,48	25,69
			Supplement	56,8	60,63	62,09	74,08	68,1
			Not used	21,64	14,54	4,09	7,44	6,21
		e) material from different curricular areas	Basis for instruction	28,52	25,99	24,77	34,17	18,14
			Supplement	65,05	61,31	61,86	62,72	71,51
			Not used	6,42	12,7	13,37	3,11	10,36
		f) children's newspapers and/or magazines	Basis for instruction	10,88	16,58	27,35	7,49	14,04
			Supplement	64,6	58,5	55,77	79,46	67,74
			Not used	24,51	24,92	16,87	13,05	18,22

Meso	Classroom	Teacher	Ordinal	g) computer software for reading instruction	Basis for instruction	2,07	1,5	6,58	0,73	8,77
					Supplement	7,66	18,03	25,96	11,28	37,72
					Not used	90,26	80,47	67,46	88	53,51
				h) reference materials (e.g. encyclopaedia, dictionary)	Basis for instruction	5,5	12,9	22,52	15,7	18,51
					Supplement	58,2	56,23	55,79	55,68	80,64
					Not used	36,29	30,87	21,69	28,62	0,85
		Teacher	Nominal	Do the Grade 4 learners in the PIRLS class have computer(s) available to use during their reading lessons?	Yes	18,34	17,58	23,2	24,17	28,91
					No	81,66	82,42	76,8	75,83	71,09
				If yes, do any of the computers have access to the internet?	Yes	35,6	23,08	53,8	52,51	96,63
					No	64,4	76,92	46,2	47,49	3,37
			Nominal	A. Do you have a library or reading corner in your classroom?	Yes	56,41	64,4	72,51	73,87	85,99
					No	43,59	35,06	27,49	26,13	14,01
		Teacher	Ratio	B. About how many books are in your classroom library?	0-25	40,48	29,43	19,86	34,47	24,22
					26-50	15,33	34,28	25,23	28,12	33,61
					51-100	19,34	9,88	35,48	18,78	26,45
					More than 100	24,85	26,41	19,43	18,63	15,72
			Ratio	C. About how many magazines with different titles are in your classroom library?	0	20,14	22,07	13,6	9,31	23,65
					1-2	19,85	13,18	13,13	10,03	25,15
					3-5	12,28	37,79	33,32	22,89	21,6
					More than 5	47,73	26,97	39,95	57,77	29,61

8.3. Appendix C

Conceptual Framework		Questionnaire	Measurement Level	PrePIRLS 2011 Variables	Possible answer	Q1	Q2	Q3	Q4	Q5
Bronfenbrenner	PIRLS									
Micro	Home	Learner	Ratio	About how many books are there in your home? (Do not count magazines, newspapers, or your school books.)	None or few (0-10)	52,3	58,52	50,64	43,1	30,48
					one shelf (11-25)	26,09	21,64	30,98	27,77	30,63
					one bookcase (26-100)	11,33	7,19	9,91	14,4	21,94
					two bookshelves (101-200)	5,61	4,63	3,39	6,81	9,1
					three or more bookcases (200+)	4,67	8,03	5,09	7,92	7,85
				Do you have any of these things at your home?						
		Learner	Nominal	a) Computers	Yes	19,54	22,93	31,33	52,7	68,45
					No	80,46	77,07	68,67	47,3	31,55
				b) Study desk / table for your use	Yes	46,84	47,27	53,67	58,76	67,17
					No	53,16	52,73	46,33	41,24	32,83
				d) Your own room	Yes	40,36	39,02	50,49	57,39	65,5
					No	59,64	60,98	49,51	42,61	34,5
				e) Internet connection	Yes	18,99	16,84	19,89	31,78	46,38
					No	81,01	83,16	80,11	68,22	53,62
				Did your child attend pre-school?						
		Parent	Ordinal	If yes, how long was he/she in preschool?	3 years or more	26,98	23,28	26,66	31,8	41,71
					Less than 3 years by more than 1 year	33	31,31	36,99	36,58	36,08
					1 year or less	18,68	21,16	15,22	18,21	14,86

					did not attend	21,34	24,25	21,13	13,41	7,35
					0-10	59,93	62,75	61,62	56,08	37,41
					11-25	24,61	24,82	24,16	22,67	22,82
		Parent	Ratio	About how many books are there in your home? (Do not count magazines, newspapers or children's books)	26-100	8,85	7,29	9,33	14,83	23,24
					101-200	2,94	1,94	1,64	4,11	7,66
					More than 200	3,67	3,19	3,24	2,31	8,87
					0-10	63,22	70,39	68,91	62,2	47,51
					11-25	20,42	18,27	19,82	21,2	21,95
		Parent	Ratio	About how many children's books are there in your home? (Do not count magazines, newspapers or school books)	26-50	7,94	5,8	7,34	10,34	16,58
					51-100	4,41	2,92	1,73	3,66	9,68
					More than 100	4,01	2,62	2,2	2,61	4,28
					University or higher	3,04	3,54	4,91	10,7	23,33
					Post-secondary but not university	10,44	10,75	12,43	17,51	32,51
		Parent	Ordinal	What is the highest level of education completed by the child's father (or stepfather or male guardian) and mother (or stepmother or female guardian)?	Upper secondary	35,11	39,52	42,84	43,28	33,05
					Lower secondary	17,05	18,75	16,22	13,38	6,49
					Some primary, lower secondary or no school	33,35	26,69	21,83	13,15	3,72
					Not applicable	1,01	0,75	1,77	1,98	0,9
Micro	Home				professional	7,11	7,72	11,61	20,74	42,64
					small business owner	9,77	9,2	10,94	12,65	11,91
					clerical	15,35	14,9	16,69	22,31	23,18
		Parent	Ordinal	Parent's highest occupational level	skilled worker	15,78	16,36	18,98	11,91	6,18
					general labourer	17,08	19,11	14,15	12,92	7,5
					never worked outside home	22,43	20,21	17,06	10,21	3,25
					not applicable	12,48	12,49	10,58	9,26	5,33

8.4. Appendix D

Conceptual Framework		Questionnaire	Measurement Level	PrePIRLS 2011 Variables	Possible answer	Q1	Q2	Q3	Q4	Q5
Bronfenbrenner	PIRLS									
				How often do you use a computer in each of these places?						
Individual	Individual	Learner	Ordinal	a) At home	Every day	48,8	42,75	46,31	50,52	51,52
					Once or twice a week	13,58	11	13,25	17,88	23,16
					Once or twice a month	5,98	4,24	5,68	7,81	9,76
					Never	31,64	42,01	34,76	23,79	16,02
				b) At school	Every day	49,04	42,39	38,39	36,34	29,56
					Once or twice a week	16,97	12,15	21,01	24,91	48,29
					Once or twice a month	9,18	7,03	6,8	5,38	6,55
					Never	24,81	38,44	33,8	33,37	15,6
			Ordinal	How often do you borrow books from your school or local library?	Every day	34,88	33,63	35,87	42,74	52,78
					Once or twice a week	22,1	20,47	23,48	19,7	17,2
					Once or twice a month	22,52	18,34	17,5	20,85	14,28
					Never	20,49	27,57	23,14	16,71	15,74