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Reading between the Lines: Contributing Factors that Affect Grade 5 Learner Reading Performance.

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ABET	Adult Basic Education and Training
CEA	Centre for Evaluation and Assessment
DET	Department of Education and Training
DoE	Department of Education
DPC	Data Processing Centre
ECD	Early Childhood Development
GDP	Gross Domestic Product
GNU	Government of National Unity
HIV	Human Immunodeficiency Virus
HOA	House of Assembly
HOD	House of Delegates
HOR	House of Representatives
HLM	Hierarchical Linear Modelling
IEA	International Association for the Evaluation of Educational Achievement
IRT	Item Response Theory
ISC	International Study Centre
LANGTAG	Language Planning Task Group
LOLT	Language of Learning and Teaching
NAEP	National Assessment of Educational Progress
NRC	National Research Coordinator
NQF	National Qualifications Framework
NTB	National Training Board
OBE	Outcomes Based Education
PANSALB	Pan South African Language Board
PIRLS 2006	Progress in International Reading Literacy Study 2006
PISA	Programme for International Student Assessment
PSNP	Primary School Nutrition Program
RNCS	Revised National Curriculum Statement
SACMEQ	Southern and Eastern African Consortium for the Monitoring of Educational Quality
SE	Systemic Evaluation
SITES	Second Information Technology in Education Study
SPSS	Statistical Package for the Social Sciences
TIMSS	Trends in Mathematics and Science Study
UN	United Nations

ABSTRACT

This study aims to identify and explain relationships between some major factors associated with successful reading at Grade 5 level in South African primary schools. In South Africa, grave concerns with regards to low levels of student achievement pervade research initiatives and educational debates. Despite considerable investments in educational inputs (such as policy and resources) and processes (such as curriculum provision and teacher support), outcomes (such as student achievement) remain disappointingly low. The South African population is characterized by great diversity and variation. With 11 official languages, current educational policy in South Africa advocates an additive bilingualism model and students in Grade 1 to 3 are taught in their mother tongue. Thereafter, when these students progress to Grade 4, the language of learning and teaching changes to a second language, which in most cases is English. At this key developmental stage students are also expected to advance from learning to read to a stage where they can use reading in order to learn.

With this complexity of issues in mind, Hierarchical Linear Modeling (HLM) was used to determine the effect of a number of explanatory variables at learner- and school level on reading achievement as outcome variable, while controlling for language using the South African Progress in International Reading Literacy Study (PIRLS) 2006 data. As an international comparative evaluation of reading literacy involving more than 40 countries, PIRLS 2006 was the second, after PIRLS 2001, in a series of planned five-year cycles of assessment to measure trends in children's reading literacy achievement, policy and practices related to literacy.

Grade 5 learners in South African primary schools who participated in PIRLS 2006 were not able to achieve satisfactory levels of reading competence. The gravity of this finding is exacerbated by the fact that these learners were tested in the language in which they had been receiving instruction during the Foundation Phase of schooling.

This study found most significant factors associated with reading literacy at learner-level, but this does not mean that the existence of teacher- and school-level factors is not of importance. While some explanatory factors at learner-level can more easily become the target of reading interventions, the higher level effect of the classroom and school are not diminished by this study.

Creemers' Comprehensive Model of Educational Effectiveness was utilized as theoretical point of departure. Creemers' model was adapted for the purposes of this study to reflect a South African model of reading effectiveness in contrast with Creemers' original use of it as a model of school effectiveness. Evidence was provided that the conceptual framework was inadequate in identifying factors affecting reading achievement for all South African language groupings. More specifically, the adapted South African reading effectiveness model was only appropriate in explaining reading achievement scores for the Afrikaans and English language groupings than for those from African language groupings.

Keywords: *secondary analysis, educational policies, reading literacy, PIRLS 2006, international comparative studies, Hierarchical Linear Modelling, Creemers' Comprehensive Model of Educational Effectiveness, nested data, explained variance.*

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CHAPTER 1: INTRODUCTION

"The greatest gift is the passion for reading. It is cheap, it distracts, and it gives you knowledge of the world and experience of a wide kind. It is a moral illumination."

Elizabeth Hardwick

This study proposes to identify, illuminate and explain relationships between some major factors associated with successful reading at Grade 5 level in South African primary schools. In an attempt to understand learners' difficulties with reading and writing, Rhodes and Dudley-Marling (1996:2) stated the following:

> Working with struggling students inevitably means working with disproportionate numbers of poor White, Black, Hispanic, Aboriginal and bilingual students – students whose struggles in school have less to do with their capabilities than the abilities of schools to recognize the range of individual, social and cultural differences students bring with them to school. The standardized, one-size-fits-all curricula found in so many schools today imagine students to be pretty much the same, but they're not.

In an attempt to investigate South African learners' reading performance when given reading tasks in the language of learning and teaching, this study is in agreement with Rhodes and Dudley-Marling: the causal elements and reasons for struggling to read are not the same for all learners. Just as one-size-fits-all curricula are inappropriate, so a singular or a one-dimensional explanation for learners' poor reading performance is equally inappropriate and inadequate for addressing a vastly varying and diverse learner population.

In understanding the reasons for poor reading performance and identifying those factors that can be associated with successful readers and with those learners at risk of failure, three systems have a major influence on reading

performance, namely the home, the school and the learners themselves. Factors pertaining to Grade 5 learners that could impact on reading performance through their home environment, the classroom and the school, will be identified in this study, and used to map learner profiles within each of the country's language groups.

This study makes use of data from the Progress in International Reading Literacy Study 2006 (PIRLS 2006), a recently conducted study undertaken in South Africa in October 2005 under the auspices of the International Association for the Evaluation of Educational Achievement (IEA). PIRLS 2006 is the second study, in a planned series of five-year cycles of assessment (beginning with PIRLS 2001) to measure trends in children's reading literacy achievement and in policy and practices related to literacy, across more than 40 countries. In South Africa the PIRLS 2006 instrument was used to assess Grades 4 and 5 learners at suitably sampled schools.

PIRLS 2006 aims to describe trends and international comparisons for:

- The reading achievement of Grade 4 learners
- Learners' competencies in relation to goals and standards for reading education
- The impact of the home environment and the manner in which parents foster reading literacy development
- The organization, time allocations and reading materials for learning to read in schools
- Curriculum and classroom approaches to reading instruction

For reasons explained in a subsequent chapter, the South African PIRLS 2006 Grade 5 data is the focus of this study.

On the African continent, indicators of educational achievement are echoed in studies such as the Southern and Eastern African Consortium for the Monitoring of Educational Quality (SACMEQ I and II). Indicators of educational

achievement in African countries can typically be divided into five categories, namely: (1) Learner background characteristics (such as regularity of meals taken, parents' education, school related factors such as frequency of homework); (2) Teacher characteristics (including age, sex, training, experience); (3) Institutional characteristics (availability of infrastructure and state of facilities); (4) Teaching resource characteristics (such as teaching materials and the availability of basic learning materials); and (5) Teaching function characteristics (including aspects of frequency of assessment, meeting with parents and school climate).

This study, partly through its use of the South African PIRLS 2006 Grade 5 data, is placed within a broader educational context, but also emphasizes the role of reading, literacy and lifelong learning alongside learner, teacher and school indicators of achievement.

1.1. THE LEARNING-TO-READ PROBLEM IN ITS SOUTH AFRICAN CONTEXT

The realities for some South African school children have to be born in mind when making any attempt to understand or illuminate those factors that affect reading performance. The following extract illustrates the need for a contextual understanding of learner performance in a study such as PIRLS 2006:

> Not even the crocodile infested Nyalazi River can keep the eager children of Bhekinkosi Senior Primary away from school. Driven by a desperate yearning for education, the children leave their home at the crack of dawn to cross the often swollen river – also home to hippos and snakes. When the river is running high the children, some as young as six, cram into a makeshift raft of shriveled branches and use their hands to paddle across. With a few books and their school uniforms held high over their heads, they make their way along a narrow footpath on their 8km trek to school. The pupils often miss school when the river is in flood. Sometimes the raft becomes waterlogged and cannot be used. At

other times they are delayed when there are lots of people wanting to cross. (Govender, 1998, p.14).

According to Rule (2006), South Africa has 15 million people who have had less than nine years schooling, while 4.5 million people have never been to school. In addition, this disadvantaged population is generally regarded as functionally illiterate and can neither contribute effectively to the economy nor benefit from the economy as its members might hope.

In an attempt to provide the reader with a clear picture of the social and economic background against which the National and Provincial Departments of Education are expected to provide quality education, the following section will report some basic statistics on South Africa as a country. This profile will be followed by detailed descriptions of some prominent issues the country faces in terms of learner drop-out and failure rates, the impact of HIV/AIDS, and the prevalence of poverty in the country's profile. These issues are mentioned not in an attempt to find answers in the current study, but rather to sketch a contextual background against which many learners in the schooling system are expected to perform and progress from one grade to the next.

1.1.1. South Africa: A Brief Background and Basic Statistics

South Africa is an upper-middle-income country (World Bank, 2008). The country consists of nine provinces with 11 official languages. It is characterized by stark contrasts and it is not uncommon to see evidence of hunger, destitution and poverty side-by-side with affluence and wealth.

Currently, World Bank estimates place the GNP at $224 billion per annum (World Bank, World Development Indicators, 2008). South Africa's social context over the last ten years paints a disconcerting picture, as Aliber (2001) refers to an adult poverty line of R325 per month and states that 71.6% of all poor people reside in rural areas. Stated otherwise, it implies that 70.9% of all

rural people are poor. Using the same poverty line as reference, 61% of Blacks are poor, 38% of Coloureds, 5% of Asians and 1% of Whites.

According to Woolard (2002) approximately 15% of the adult population is illiterate and about 9.2% of children under the age of five are malnourished. Among households in the poorest quintile in 1995, 51% of all expenditure was on food. Around 23% of children under the age of 6 are stunted, indicating chronic under-nutrition, while the most frequently affected children can be found in rural areas where mothers have relatively little education (Aliber, 2001).

The turn of the century saw South Africa suffering from acute problems in several social and demographic aspects. Life expectancy had dramatically declined from 62 years in 1990 to only 48 years in 1999, mainly as a result of the impact of HIV/AIDS (Woolard, 2002). It was estimated that 13% of the population and as many as 25% of the adult population were infected with the Human Immunodeficiency Virus (HIV). Nor have the figures improved, with the Statistics South Africa Mid-Year Population estimate report (2009) suggesting an overall HIV prevalence rate at 10.6%, an infant mortality rate at 45 per 1000 live births and the maternal mortality rate standing at 230 per 100 000 live births. From a total population of 44 million, approximately 8 million are surviving on less than the one dollar per day poverty line (the international benchmark indicating poverty, roughly less than R7.00 per day), with another 18 million living on less than 2 dollars per day (between R7 and R14 per day).

In terms of South African currency, 37% of households survive on less than R1000 per month as measured in 2002, while 60% of the poor do not receive government aid in the form of social transfers or grants (Woolard, 2002). Access to services is highly skewed by income level, location and race. Aliber (2001) mentions that 18% of households within the poorest decile must travel more than one kilometer to access water, as opposed to 1% of households in the top three deciles.

Table 1.1 (below) is adapted from the General Household Survey (Statistics South Africa, 2004) covering the period 2002 to 2004 and provides information on education and employment:

Table 1.1: General Household Survey Totals for Education and Employment

Indicators	2002	2003	2004
Number of Persons (Thousand)	**45 533**	**46 007**	**46 459**
Education			
Number of Persons aged 7-15 years	9 104	9 118	9 244
Percentage attending school	96.3	97.1	97.8
Employed Persons (15-65 years)			
Percentage of population of more skilled occupations (including managers, professionals, semi-professionals and technicians)	21.6	22.0	22.4
Source of financial support for persons not employed (15-65 years)			
Percentage of population receiving old age pension/disability grant	6.8	8.4	9.4

The statistics for schools follow a similar pattern to that of the country's overall population. Reports from 2000 stated that the majority of schools were still poorly resourced, to the extent that one-quarter were water-deprived and did not have water within walking distance (Harber & Muthukrishna, 2000). Only approximately 8% of these schools have access elsewhere to a communal tap, and this facility is often at some distance. Electricity provision in schools is scarce and the provision of toilets and sanitary facilities falls short of reasonable standards. Harber and Muthukrishna (2000) reported that in KwaZulu Natal. 66% of schools do not have telephones, 66.2% do not have toilets and one quarter of school buildings are considered to be too dangerous for occupation by learners and hence not fit for educational purposes. Textbook provision falls between categories of 'adequate' and 'inadequate', yet more disturbingly 82% of schools do not have media or teaching equipment.

Despite this bleak picture, enrolment rates in schools at the turn of the century were still high (Woolard, 2002). Yet despite high enrolment rates, Harber and Muthukrishna (2000) noted an absence of 'a culture of learning and teaching' in South African schools. In the province of Gauteng in particular, many schools were characterized by sporadic attendance of staff and learners alike, principals who had lost interest in solving problems and teacher morale that was so low that many had lost their desire to teach. Problems of violence in schools were a by-product of extreme poverty, with gangsterism, vandalism, drug abuse and rape rampant. These conditions were particularly to be found in rural areas, where the contrast with urban schooling was most pronounced (Woolard, 2002).

In light of these extensive problems that seemed to pervade reports on South African education since 2000, attempts have been made to put a number of improvements in place. For example, the then Minister of Education, Naledi Pandor, appointed a Ministerial Committee on Rural Education, whose report was presented to the minister in June 2005 (DoE, 2005). Upon their recommendation, a framework for Quality Education in Rural Areas was formulated to focus on the improvement of teaching and learning in rural schools; attracting and retaining learners; planning; restructuring and improving infrastructure; building effective school governance and management; advocacy, and promoting sustainable partnerships to implement programmes for rural development and community cohesion. Further work and recommendations by a number of panels and committees are represented in the Department of Education's National Report on the Development of Education (2009).

Racially segregated education was one of the central pillars of the apartheid system in South Africa and resulted in black South Africans specifically having severely limited residential and school choices, as well as tightly constraining funding and staffing decisions by management (Case & Yogo, 1999). The Bantu Education Act of 1953 had ensured control of Black education and linked tax receipts from blacks to public expenditure on those elements of education to which they were permitted access (Thomas, 1996).

However, despite the emergence of radical social change after the 1994 democratic elections, economic and educational change and the distribution of educational growth and attainment has not been the same for all racial groups. According to Thomas (1996), growth in educational attainment for Whites, Coloureds and Asians has accrued to those at the bottom of the educational ladder, and the effects of growth can best be discerned among the less educated. However, amongst blacks, the least educated have largely been excluded from the rise in years of schooling over the last 50 years and instead, blacks at the top of the education ladder have benefited most. In terms of actual figures, blacks in the top quartile have completed seven more years of schooling over the last five decades, in comparison to blacks in the bottom quartile, who have gained only an additional 1.5 years, over the same period. For women, educational attainment and growth has increased slightly faster relative to men in the White, Coloured and Asian groups. Yet again, there has been no growth in the bottom quartile, while the top quartile enjoyed the most growth, amongst black women (Thomas, 1996).

With the first all-race democratic elections in 1994, the African National Congress (ANC) - led government inherited a more or less functional social security system, but very little in terms of existing systems to assist poor people to find a way out of poverty. According to Aliber (2001), government strategy up to that time had been to promote economic growth in order to expand employment opportunities and income levels. However, real growth had been modest and the most tangible anti-poverty strategies had involved improved access to services and infrastructure in urban and rural areas (Aliber, 2001).

Results from the General Household Survey conducted in July 2004 (Statistics South Africa, 2004) support claims of modest growth, suggesting that in terms of the main dimensions of poverty (including education, health, employment and access of households to water supply and sanitation services), the situation in South Africa marginally improved between 2002 and 2004. For example, the Household Survey indicated that the percentage of dwellers living in informal structures decreased from 12.7% in 2002 to 11.3% in 2004. In terms of water supply, sanitation and refuse removal services, a steady increase was noted

from 55% of all households in 2002 to 57.1% in 2004. Over the same period the percentage of households in which an adult went hungry decreased by 6.9% (Statistics South Africa, 2004). Examples of positive outcomes like these can perhaps be construed as some positive contributory factors to the modest improvement of living standards and circumstances in South African households.

1.1.2. The Impact of HIV and Aids

Another phenomenon in South African society of great concern is the spread and prevalence of HIV and AIDS. According to Noble (2007), the South African Department of Health estimated that 47% of all deaths during 2006 in South Africa could be ascribed to AIDS. Among adults aged 15-49 years of age, these estimates were as high as 71%, with worst occurrences in the provinces KwaZulu Natal, Mpumalanga and Gauteng. Dorrington, Johnson, Bradshaw and Daniel (2006) provided equally disturbing figures of 5.4 million people out of a total population of 48 million estimated to be HIV positive in mid-2006. Maree and Ebersohn (2002) reported estimates dating to May 2001, of at least 4.7 million South Africans being HIV positive. It was inferred that the number of orphans and children under 15 years of age who have lost one or both parents will rise steadily throughout the subsequent ten years to reach a peak of 2.5 million by 2012.

The effect of the HIV/AIDS pandemic in South Africa can be illustrated by anecdotal evidence during the PIRLS 2006 field test conducted in March 2005, in that a sampled school could not be visited on schedule due to the number of funerals being held for teachers having died in the same week because of the disease.

In relation to the impact of HIV and AIDS on the education sector at the turn of the century, Coombe (2000) noted the sector included some 375 000 teachers, at least 12% of whom were reported to be HIV positive. In this regard Maree and Ebersohn (2002) predicted that a vast numbers of educators would be lost

to education, not only due to death, but also to social mobility, as educators were likely to leave the service for better jobs in the private sector. Meanwhile Coombe (2000) predicted that many educators would lose interest in professional development once they knew they were HIV positive. Even uninfected educators were likely to struggle emotionally and financially with sickness and death among relatives, friends and colleagues. Most educators would be forced to take on additional teaching responsibilities in the wake of sick and affected colleagues unable to come to work.

Maree and Ebersohn (2002) stated that fewer children would be likely to enrol in school because of HIV and AIDS. With mothers dying young and children who themselves were ill, impoverished, orphaned or caretakers of younger siblings, school enrolment rates were predicted to fall along with retention, transition and completion rates. Booysen, Bachmann, Matebesi and Meyer (2004) pointed to the growing orphan crisis that came to impact significantly on family life and household composition. The extended family plays a crucial role in terms of support and care. Evidence from a study conducted in the Free State (with data collected in Welkom and Qwaqwa) indicated that the epidemic was impacting entire communities rather than individual households, particularly in the context of the orphan crisis (Booysen et al., 2004).

In addition, financial constraints were predicted to make it difficult for provincial Education Departments to provide formal education of adequate scope and quality. Maree and Ebersohn (2002) predicted that increasingly resources would be switched away from education to other social sectors, such as health and welfare, while contributions from parents and communities could be expected to decline as HIV-affected households were unable or unwilling to keep children educated and in school. According to Maree and Ebersohn (2002), the trauma of death and loss was likely to overwhelm individuals and communities, and at the very least school performance would inevitably decline. With predictions of 20% to 30% of all educators, departmental officials and learners ill and affected by HIV, morale was expected to be low, with an accompanying inability to concentrate on learning and professional matters.

1.1.3. Learner Drop-Out and Failure Rates

Since 1994, South Africa has been undergoing radical social, political, economic and cultural changes. Changes on the education front included the new curriculum and the introduction of an outcomes based system of education (OBE). As Zinn (2000) records, other changes involved the introduction of a single National Department of Education, replacing the 19 different education departments of the past era. The rationalization of the civil service drained the teaching core of thousands of valuable, experienced educators.

Despite national efforts, South African school learners have repeatedly been failing grades or leaving school, a trend that is reported by Taylor, Fleisch and Shindler (2008) in their review of educational changes in South Africa since 1994. Almost half of learner drop-outs from the system were attributed to a lack of basic learning skills, more specifically, a lack of adequate language skills. According to Motala (1995), reducing repetition and drop-out rates amongst primary school-goers was one of the new government's major challenges. The 1990 Jomtien Conference on Education for All had identified a number of problems facing the primary school sector in developing countries. These problems include access, retention, completion and quality, highlighted in the context of estimates that fully 1.6 million African children between the ages of 6 and 13 were not in school in 1992, and that only between 51% and 62% of African enrolments in the first year of primary schooling would reach Grade 8 within 12 years. This percentage for black children was in contrast to 96% of white learners reaching the same grade within 8 years (Motala, 1995: 161). Two of the most significant consequences of drop-out rates and repeated failure were that children were likely to leave school illiterate before ten years of age. Another consequence was the creation of a 'bottleneck', or congestion in lower primary schools, where enrolments of 50% more than expected could place additional burdens on a system that was already under-resourced.

Since the publication of disturbing figures of learner drop-out rates in the late 1990s, a Ministerial Committee on Learner Retention in the South African Schooling System was appointed by the then minister Naledi Pandor. Some key

findings and conclusions of the committee stated that the problem of learner retention was more pronounced after Grade 9. For these learners, the system did not provide sufficient alternatives. The committee found no evidence of anomalies between Grade 1 and Grade 2 that pointed toward dropping-out, and while retention was improving, South Africa now compares more favourably to other developing countries on progression rates (DoE, 2007).

According to Pretorius and Naude (2002), South African learners compared unfavourably with other countries with regards to literacy and numeracy development, while the repeating of grades and the failure rate in the National Senior School Certificate examination taken in Grade 12 both indicated considerable underachievement, specifically amongst black learners.

Also of concern was the ever-widening gap in performance between children from rural or township backgrounds and children from urban areas. In the South African context, townships refer to those informal settlements, often found on the outskirts of urban areas, characterized by makeshift houses (or shacks). These townships are associated with lack of basic services (such as sanitation), lack of resources and generally poor quality of schooling offered to children inhabiting them. In a study undertaken by Pretorius and Naude (2002) on the topic of poor reading and writing ability among children in South African townships, it was found that only 36% of primary school children could take a book, turn it into the correct position and open it as if they were about to read from it. Only 43% of children knew that words tell the story in a book. Pretorius and Naude (2002) ascribe this underachievement to a lack of books in the home, to parents or caregivers who themselves are illiterate and do not demonstrate reading at home, and to the lack of proper pre-school education. Adding to the problem was an enormous gap between a rural home culture and that of the school culture of children living in townships. Many parents are originally from rural areas and they uphold a rural home culture, but have become urbanized by occupation. The rural home culture seems to be in a state of uncertainty and turbulence, resulting in children being confronted with two different systems, namely a rural culture at home and a school culture rooted in a western paradigm.

Linked to failure rates and the tendency to drop out of school is that South Africa, like many other developing countries, had food security concerns. According to Bonti-Ankomah (2001), estimates were that 39% of the South African population was then vulnerable to food insecurity, with 29% of children under the age of nine being stunted due to chronic malnutrition. Stunted growth implies such children have a low weight for their age and deficiencies in nutrients such a vitamin A, iron and iodine. Food insecurity was highest among the black population and rural households and Bonti-Ankomah (2001) believed that women and children would bear the worst long-term consequences of food insecurity because of its impact on their learning ability and productivity in adult life. Poor nutrition leads to limited capacities to learn, attention deficits, sensory impairments and poor school attendance.

School feeding programmes, in which learners are fed meals at school, were seen as a way to reduce short-term hunger and improve nutrition in order to enable children to concentrate and perform better academically. According to Abrahamson (2004), feeding schemes would also provide parents with the economic incentives to send their children to school. Where food was offered at school, attendance and enrolment rates were shown to increase. As part of the National Department of Education's commitment to providing quality education, schools in areas of extreme poverty were provided with food to give children meals at least once daily, as part of the Primary School Nutrition Programme (PSNP). As part of the Reconstruction and Development Strategy Framework established in April 1994, the emphasis of feeding schemes at primary schools aimed at improving children's active learning capacity, educating learners about nutrition, and enhancing broader development initiatives. According to Bonti-Ankomah (2001), the October Household Survey of 1999 indicated that 4.26 million children in South Africa aged between 7 and 15 years benefited from such feeding schemes at school. This number represented 45% of children of that age group in South Africa, of whom 90% were black, and 31% from urban areas as compared to 56% from rural areas.

1.2. RESEARCH QUESTIONS FOR THIS STUDY

The potential significance of this study is that factors associated with reading literacy achievement can be illuminated and understood against objective measures of achievement in each of the 11 official languages. The magnitude of the PIRLS 2006 study for South Africa has to be taken into account, since 11 official languages in essence implies that the study had to be replicated 11 times to provide assessment measures for all language groups in the country.

This study will not only add to the body of knowledge of South African learner achievement, but will also attempt to create new theories and insights into patterns of achievement when language is controlled for. Importantly, for the first time, data is available for almost 16 000 Grade 4 and 15 000 Grade 5 learners taken from a representative national sample. The available data not only pertains to achievement data, but also contextual data on learner, home, classroom and school-level. Such a rich source of data allows for multi-level analyses.

The South African PIRLS 2006 study forms part of a larger study with the primary aim to compare educational achievement across 40 countries. This PhD study takes the form of a secondary analysis of the South African PIRLS 2006 data, thus utilizing achievement data as obtained from a nationally representative sample within the context of an internationally comparative study.

The main research question that guides this PhD study is:

What are the factors that could be associated with Grade 5 learner performance in reading literacy?

Measurements obtained in at least proxy data from the PIRLS 2006 project will be used in an attempt to answer this question. Factors emanating from contextual questionnaires of Grade 5 learners, their home environment, their

schools and classrooms will be identified in conjunction with learners' test scores on the PIRLS 2006 achievement tests.

The main research question can be divided into the following sub-questions:

1. What is the Grade 5 learner performance on the PIRLS 2006 assessment?
2. What is the extent of variation across the language groupings in Grade 5 learners' reading literacy performance?

Based on Grade 5 learners' performance in the PIRLS 2006 achievement tests, the assumption is that variation will exist between different groups of learners, in this case particularly based on language group. It is hypothesized that variation within groups of learners on reading literacy tasks will differ between groups and the sources of variance might be different for distinct groups. In cases where learners struggle to read, the reasons for struggling might be varied. Two further sub-questions therefore aim to investigate these sources of variance for various groups of learners participating in PIRLS 2006.

3. What factors related to the learners' background (for example motivation to read, language skills and home environment) affect performance in reading literacy?
4. To what extent do the school and classroom environment affect reading literacy performance?

Factors emanating from the PIRLS 2006 learner and parent questionnaires will be used to answer sub-question 3, while information gathered through the school and teacher questionnaires will be used to answer sub-question 4.

It is expected that some factors might have a direct impact on reading performance, but it is proposed that the relationship between factors and reading performance might not necessarily be linear or direct. A simple example of a direct, linear relationship between factors and reading performance would be that an enabling home environment will likely lead to the development of an

enabled child. This relationship in turn is likely to lead the child to enter into an enabling school, thus resulting in a successful reader who has the ability to use reading effectively in everyday life. On the other hand, a disenabling pathway means that a child coming from an ineffective home is likely to be at a developmental disadvantage, and is likely to attend a disenabling school environment characterized by ineffective teaching practices and lack of opportunity for the child to read and learn. The result of such a pathway would be a disenabled reader, who is unable to read to learn.

These examples illustrate a conceptual path in a very simplistic fashion, where one enabling factor leads to the next, resulting eventually in a desired outcome and an equally simplistic path by one disenabling factor leading to the next, resulting in which a lack of reading ability.

For the majority of South African Grade 5 learners, a picture of more complexity is suspected, where an exchange between factors is more likely to occur. Currently, the South African learner population is characterized by great diversity and variation. At one end of the spectrum, a learner from a rural, disadvantaged community with lack of resources might not be able to read. At the other end of the spectrum, a learner from an advantaged, affluent community where resources are widely available might also not be able to read. Just as these learners come from two different environments, the factors behind their inability to read are also vastly different. The developmental paths they followed, their cultural, social and individual circumstances and the influencing factors that impacted on their reading abilities may be greatly different, but for both learners lead to the same result: an inability to read.

An interaction between factors therefore implies a multiplicity of exchanges or interactions between enabling and disenabling factors, resulting in the possibility of a number of complex combinations of factors that could predict learner reading performance. The fifth sub-question then arises:

5. How do these relationships between factors differ or remain constant across the language groupings in South Africa?

The 11 official languages in South Africa can be classified and reduced into five groupings, namely English, Afrikaans, Tshivenda, Sotho and Nguni, with Afrikaans and English as the languages spoken by a large part of the population and Nguni languages forming the largest group. The remaining languages can be classified as Sotho (including Sesotho, Sepedi and Setwana) and Nguni (including isiZulu, isiXhosa, isiNdebele, Siswati and Xitsonga). Tshivenda completes the list as the language spoken by a very small section of the population. Whereas Afrikaans, English and Tshivenda are considered distinct languages, the Sotho and Nguni language groupings share common linguistic roots. Any reference to language groupings in this study would therefore allude to these groupings and are of relevance for data classification and reduction purposes.

With 11 official languages, current educational policy in South Africa advocates that learners in Grade 1 to 3 are taught in their first language (any one of the 11 official languages). When these learners progress to Grade 4, the language of learning and teaching (LOLT) becomes English or Afrikaans. For many learners this means changing to a second language. At this developmental stage, learners are also expected to advance from learning to read to a stage where they can use reading in order to learn. Using learners' achievement scores as obtained in the PIRLS 2006 assessment when tested in their language of learning, question 5 will aim to investigate whether instruction in a native language contributes significantly to the relationship of factors associated with reading performance.

A distinction is made in this study between 'first language', 'language of learning' and 'language of the test'. South African children start their learning at school from Grade 1 to 3 in their home language (first language). However, many schools are faced with teaching learners in these grades in a language of learning that is still different from what is spoken at home. When learners approach Grade 4, the language of learning changes again, resulting in more than 80% of learners being taught in a further second language (mostly English, a language spoken by less than 10% of the population). For Grade 1 to 3 learners, 'first language' does not necessarily coincide with 'language of

learning' or 'language of the test'. For the purposes of data analysis in this study, language groups will therefore be defined by means of 'language of learning' (in Grades 1 to 3), since the term 'first language' is not accurately indicative of whether a learner does in fact receive instruction in his or her home language. Reference to 'language of learning' and 'language of the test'[1] will be used interchangeably.

1.3. STRUCTURE OF THE THESIS

Chapter 2 of this thesis builds on constructional elements mentioned in this introductory chapter, by elaborating on the South African schooling system, policies and reforms that have characterized the national Department of Education (DoE) over the past few years. Of particular importance are the language-in-education policies, and particular attention is paid to describing the status and profile of each of the language groups in South Africa. The focus in chapter 2 on language should not create the expectation that this study takes the form of a linguistic study. Rather, data will be reduced and classified according to language groups in an attempt to identify those factors that have a significant impact on Grade 5 learners' reading achievement in one or more language arenas.

Chapter 3 reviews current literature on Grade 5 reading achievement and provides a detailed account of the conceptual framework that is used and adapted to serve as a theoretical point of departure for the purposes of this study. The factors associated with reading achievement as found in internationally comparative assessments are considered. South African reading achievement in particular and the status of learner achievement in the country is described in reference to nationally conducted studies thus far. The chapter concludes with a discussion on the factors at learner, home, school and classroom-level that are known to impact on reading achievement.

[1] PIRLS 2006 requires the language of the test to be the language in which learners have received instruction in the first four years of schooling. For this reason, Grade 4 and Grade 5 learners were tested in all 11 official languages for purposes of PIRLS 2006.

Chapter 4 provides a detailed description of the PIRLS 2006 study. Particular attention is paid to the study's design in South Africa and also provides detailed information on the study's background, its research questions and conceptual ideas with regards to reading achievement. Technical aspects pertaining to instrument design and development in terms of the achievement booklets and contextual questionnaires, sampling frameworks, assessment frameworks, data collection and data processing are also discussed in-depth.

Chapter 5 elaborates on the research design and data analysis techniques employed for the purposes of this study. It describes in particular the methods that will be employed to answer research questions posed by this study and outlines the theoretical framework that will be used for the purposes of selecting variables for analyses in building models per language group. The PIRLS 2006 main study sought to make international reading achievement comparisons among participating countries. This set of comparisons is accomplished by deriving a national mean score based on plausible values from performance data of Grade 4 learners from each country (Grade 5 learners in the case of South Africa). For the purposes of this PhD study however, overall mean scores will not be of such importance. Rather, data will be reduced and classified according to the five different language groupings, namely Afrikaans, English, Nguni, Sotho and Tshivenda languages. In this way the study seeks to determine relationships between variables that could impact on learners' reading achievement within each specific language grouping.

Chapters 6, 7 and **8** focus upon data analysis and answering the research questions. Statistical techniques will be used in the form of Hierarchical Linear Modelling (HLM). The aim of these analyses would be to establish the nature and strength of evidence for the relationships between one or more explanatory variables (in this case obtained from items in the contextual questionnaires) and one or more outcome variables (reading achievement scores for the different language groupings), for learners who are nested within schools. While chapter 6 focuses on providing descriptive results for the variables that were selected for this study, chapter 7 focuses on providing the reader with information on how the models were constructed.

Chapter 8 discusses the HLM results for the analyzed data on learner, classroom and school-level by describing the models involving statistically significant evidence for factors that affect learner reading achievement for each language grouping.

Chapter 9 summarises the main findings and presents the conclusions drawn. Issues arising from chapter 8 are discussed in light of the conceptual framework used for this study. Chapter 9 concludes with recommendations for research and policy development and practice in South African schools.

CHAPTER 2: THE SOUTH AFRICAN SCHOOLING SYSTEM

"Reading is a means of thinking with another person's mind; it forces you to stretch your own."

Charles Scribner

The early 1980s ushered in a period of extensive social, economic and political change in the South African landscape. The widely discredited apartheid system began to disintegrate as a result of massive internal resistance, but also in response to external pressure, such as the imposition of economic sanctions (Fiske & Ladd, 2004). January 1994 saw the dawn of a democratic era, followed by the first fully representative elections in April of the same year. Thus began the ambitious task of transforming apartheid structures, governance and policies to put in place a system in line with the needs and rights of all South African citizens. An integral part of this process of change included the transformation of the education system.

The main components of transformation in the early years of the new South African education system are summarized by Kamwangamalu (2001) as:

- The introduction of compulsory education for all population groups, specifically for children between the ages of 7 and 15, as a matter of government policy.
- A single, unified, national education system with nine provincial departments, replacing the nineteen distinct education departments of the apartheid era.
- The new national curriculum, based on the principles of Outcomes-Based Education (OBE), known as 'Curriculum 2005'.

Chapter 2 is devoted to sketching a picture of South African schools and changes that were brought about within the transition from an apartheid system to a democratic one. Attention is also paid to the curriculum landscape, the

implications and principles behind adopting an outcomes-based philosophy of education, and reforms that took place to establish the current education system. The chapter concludes with a discussion of relevant language-in-education policies and practices in light of the 11 official languages spoken within the South African population.

2.1. THE SOUTH AFRICAN EDUCATIONAL CONTEXT

Since the transition in 1994 to a democracy, the education system has undergone extensive changes and reforms. South Africa has a long history of segregated and unequal education, dating back to the early days of British rule. Blacks who managed to receive some form of education were initially educated by foreign churches and missions which took it upon themselves to tutor learners in the English language and according to western ideologies (Fiske & Ladd, 2004). By the time South Africa adopted an apartheid system, with 'separate development' along racial lines, churches and mission groups were providing schooling for nearly two-thirds of Blacks. In 1953, Parliament passed the Bantu Education Act, giving churches and mission groups a choice of either surrendering control of their schools to the government or accepting gradually diminished state subsidies.

The education system under the apartheid government sought to exercise comprehensive control over every aspect of education, and reflected National Party views in its organizational structures (Fiske & Ladd, 2004). The apartheid ideology reflected the idea that South Africa's four racial groups ("Blacks", "Whites", "Coloureds" and "Indians") should live and develop independently of one another. Consequently, separate education systems were established for each of the groups. In 1984, a tricameral parliament was created to provide Coloureds and Indians with strictly limited political powers, alongside a dominant White Assembly. Each of the three chambers was empowered to take charge of its own schools through its own departments of education. Therefore, the last years of the apartheid system of education saw White learners attending schools under the control of the House of Assembly (HOA), Coloured

learners in schools represented by the House of Representatives (HOR), and Indian learners under the directorship of the House of Delegates (HOD). Black learners had no system of their own, nor any political power, and were placed under the control of the Department of Education and Training (DET), run under the HOA. Four additional departments of education were in control of schools in the 'independent' homelands of Bophuthatswana, Ciskei, Transkei and Venda (Fiske & Ladd, 2004). The result of such an organizational structure of education meant the existence of a national Department of Education that was supported by a number of separate education departments.

Hofmeyr and Buckland (1992) used data from the Department of Education and Training of 1989 and the 1990 reports from the South African Institute of Race Relations (SAIRR) to summarize and compare education expenditure as it occurred in 1989 at the height of apartheid. Table 2.1 (below) provides an indication of the racial hierarchy and unequal provision of education at the time:

Table 2.1: Comparative Education Statistics: 1989

	White Education	Indian Education	Coloured Education	Black Education
Pupil-teacher ratios	17:1	20:1	23:1	38:1
Under-qualified teachers (less than Grade 12, plus a 3 year's teacher's certificate)	0%	2%	45%	52%
Per capita expenditure including capital expenditure	R3 082,00	R2 227,01	R1 359,78	R764, 73
Matriculation pass rate	96.0%	93.6%	72.7%	40.7%

The resources and outcomes of Indian education most closely approximated White education in the late 1980s, substantially ahead of Coloured education. Black learners, who numbered 7.1 million (or 78.1% of all learners), were the most educationally disadvantaged, and if they received schooling in rural areas matters were worse. 24% of the DET's Black learners received education in farm schools in rural areas, where great inadequacies and inequalities existed in comparison to urban schools. At the time, a mere 3% of the total of 5 782 rural schools offered schooling beyond Grade 7 (or Standard 5), while 21% of rural schools did not offer schooling beyond Grade 4 (or Standard 2) (Hofmeyr & Buckland, 1992). Fataar (1997:341) provides evidence that, despite

inadequate and unequal educational opportunities for Black learners, their numbers grew exponentially between 1953 and 1988 (see Table 2.2, below).

Table 2.2: African Learner Enrollment: 1953 - 1988

Year	Primary School Enrollment (Thousands)	Secondary School Enrollment (Thousands)	Total (Thousands)
1953	852.0	30.7	882.7
1955	970.2	35.0	1 005.2
1960	1 452.3	47.6	1 499.9
1965	1 833.0	65.6	1 898.6
1970	2 615.4	122.5	2 737.9
1975	3 378.9	318.5	3 697.4
1980	4 063.9	774.0	4 837.9
1985	4 820.1	1 192.9	6 012.9
1988	5 365.6	1 662.0	7 027.6

The expansion of African learner numbers was by no means an indicator of the quality or outcomes of their schooling. Fataar (1997) states that no improvement in the quality of education occurred, thus the challenge for the newly elected government, inter alia, was not only to expand access to schooling, but also to address low standards of existing schooling, specifically for Black learners. In their analysis of various South African data dating back to 1910, Fedderke, De Kadt and Luiz (2000) stated broadly that although the South African educational system followed a trajectory that drew ever larger numbers of learners into the system over a number of decades, it was distorted and ultimately dysfunctional.

The democratically elected government of 1994 sought to establish a single, national department of education. While accommodating approximately 11.6 million school learners, 26 489 schools and 340 000 teachers (“Educational Structures”, 2006), the aim of the national Department of Education was to develop, maintain and support an effective education and training system. In such a system, it was the goal that everyone would be able to exercise the right to receive basic education. According to the government’s document “Educational Structures” (2006), this right included adult basic education and

further education. The document affirmed the responsibility of government to make education progressively accessible and available to all South Africans.

Wilmot (2004) recognizes that in 1994, the newly elected government was faced with the task of reforming the education system it had inherited from the apartheid government, by means of introducing a plethora of policies with the explicit purpose of reconstructing the legacy of an unequal and divided past into a more equitable framework. The newly elected government, known as the Government of National Unity (GNU) was faced with various problems pertaining to education in South Africa. Fedderke et al. (2000) point out that since 1910, race instead of class had been the main predictor of educational opportunity in South Africa and therefore, by default, the main factor that provided structure to people's individual life chances and prospects.

Against this background, the democratically elected government was faced with such problems as the provision of equal access to schools, eradicating a system of unequal education opportunities, irrelevant curricula, inadequate finances and educational materials and resources, an enrolment explosion and a shortage of well-qualified teaching staff (Botha, 2002). Motala (1995) adds to this list the daunting task of reducing fall-out and repetition rates, specifically among Black primary school-goers.

2.2. THE TRANSFORMATION OF EDUCATIONAL STRUCTURES

In the first few years of the new millennium, the South African government attempted to improve infrastructure and resources, specifically to those schools previously designated as being for Blacks only. President Thabo Mbeki was quoted by Reddy (2006) as having said that "attempts have unfolded at a much slower pace than envisaged". Reddy (2006) summarized government's transformation process in two phases. Phase one entailed systemic changes, resulting in policy, legislation, protocols and other structures being put in place. Systemic changes meant that government sought to create a single, national system of education with nine provincial sub-systems. The nineteen racially

defined systems of the apartheid government were replaced by a single national system that would cooperate with each of the nine provincial education departments within the nine newly formed provinces (Fiske & Ladd, 2004). Systemic changes included the introduction of nine years of compulsory schooling. Fiske and Ladd (2004) saw government as giving absolute priority to the provision of nine or ten years of free and compulsory education, ranging from and including Grade R to Grade 9. Systemic changes also involved establishing school governing bodies with increased decision-making power, and consolidating the teaching service (Reddy, 2006). One may also note the establishment of a National Qualifications Framework (the NQF) and the introduction of an Outcomes-Based 'Curriculum 2005' (Reddy, 2006), designed to effect changes in the educational system.

Phase two was characterized by policy implementation, as debates in education shifted from issues of equal access and participation to issues of quality of teaching, the learning process and inputs at local level. Implementing new educational policies in the late 1990s was guided by a draft 'Policy Framework for Education and Training' document issued in January 1994, spelling out the guiding principles for policy reforms (Reddy, 2006). As a first step, policy reforms aimed at integrating education and training, thereby affording individuals, who had previously been denied social and vocational opportunities, the prospect of gaining new skills and formal recognition of already possessed skills and knowledge (Fiske & Ladd, 2004). The draft policy document therefore proposed to establish a single, national ministry of education, along with a national South African Qualifications Authority (SAQA), to assist learners to progress along a system of advancing levels of education and training. It was proposed that the compulsory stage of general education be followed by three years on a variety of tracks that would provide learners at all levels with credentials consistent with the integration of education and training (Fiske & Ladd, 2004).

Aspirations of policy reforms lead to the acceptance of the SAQA in 1995 (Human Sciences Research Council {HSRC}, 1995) and its official conceptualisation as a governmental body responsible for the management and

development of the National Qualifications Framework. Comprising a board of between 22 and 30 members, appointed by the Ministers of Education and Labour, and consisting of a Chairperson, Executive Director and support staff, SAQA was tasked with the following functions:

- To oversee the development of the National Qualifications Framework
- To formulate and publish policies and criteria for the registration of bodies responsible for education and training standards and qualifications
- To accredit bodies responsible for the monitoring and delivery of standards in terms of such standards and qualifications (HSRC, 1995).

The National Qualifications Framework (NQF) was intended to serve as a vehicle for fundamental restructuring of the education and training system. The NQF was conceptualized as a way of organizing learning in order to facilitate a developmental progression for learners, regardless of the particular field of learning, in which they would be engaged. In this way, the creation of flexible, new curricula would be encouraged, the upgrading of learning standards would take place, the quality of qualifications would be monitored and evaluated, and a system of accumulated credits would allow for high levels of articulation between qualifications (HSRC, 1995).

The NQF is often represented as a table (see Table 2.3, below) illustrating a broad outline of levels that compose the framework. The eight levels can be divided into three main sections, representing bands or learning contexts, each with its associated qualification or award. The General Education and Training Band (GET) represents formal education and includes learners from a reception year up to Grade 9, as well as an equivalent Adult Basic Education and Training (ABET) qualification. The Further Education and Training band (FET) includes Grade 10 to 12 and a number of industry-based and non-formal education providers (such as technical, youth and community colleges). The Higher Education band (HE) comprises nationally recognized diplomas and certificates up to and including postgraduate degrees. The levels of learning on the NQF

form the basis for progression and serve as the facilitating mechanism for achieving a coherent system of education and training (HSRC, 1995).

Table 2.3: The National Qualifications Framework

NQF Level	Band	Types of Qualifications or Certificate
8	Higher Education and Training (HE)	• Doctorates • Further research degrees
7		• Higher degrees • Professional qualifications
6		• First degrees • Higher diplomas
5		• Diplomas • Occupational certificates
4	Further education and Training (FET)	• School, college, trade certificates
3		• School, college, trade certificates
2		• School, college, trade certificates
1	General Education and Training (GET)	• Grade 9 (10 years of formal education) • ABET Level 4 • Grade 7 (8 years of formal education) • ABET Level 3 • Grade 5 (6 years of formal education) • ABET Level 2 • Grade 3 (4 years of formal education) • ABET Level 1

The remainder of this section will focus on the GET band as illustrated in Table 2.3, since this study pertains to learners in Grade 5 who form part of general

education in South Africa. The GET band is responsible for the development and implementation of policies of early childhood education, school education, ABET, inclusive education and other in- and pre-service education and training programmes (Educational Structures, 2006). To date, the band claims to have accomplished the following:

- Replaced the apartheid curricula with a new, Outcomes-Based alternative
- Improved the qualifications of many teachers who had previously been unqualified or under-qualified
- Established democratic governance in all schools
- Provided training in literacy for formal ABET programmes for over 1 million adults.

The band is structured as three phases, namely the Foundation Phase (Grades R-3), the Intermediate Phase (Grades 4-6) and the Senior Phase (Grades 7-9), and constitutes the compulsory component of the education system. The implementation of Grade R started gradually after 2002 and many children still enter the schooling system without having attended Grade R.

The target group of this study is the group of learners who have just been through the Foundation Phase of their school careers and who find themselves in the middle of the Intermediate Phase at Grade 5 level. The Foundation Phase lasts for the first three years, as most learners enter the schooling system. Learning activities during these first three years are built around Literacy, Numeracy and Life Skills. One additional language is introduced in Grade 3. Once the learner progresses to the Intermediate Phase, learning activities focus on a number of learning areas, namely Language Literacy and Communication, Mathematical Literacy, Mathematics and Mathematical Sciences, Arts and Culture, Life Orientation, Human, Social, Environmental and Management Sciences, and Natural Sciences and Technology.

It is during the General Education phase that Early Childhood Development (ECD) receives encouragement and impetus from government. ECD, a context

and background against which Grade 5 learners (the subjects of this study) should be seen, refers to the processes by which children under the age of nine develop intellectually, socially, physically, emotionally and morally. They were supposed to benefit from the Department of Education's stance on an integrated, cross-sectional approach to child development that includes health, nutrition, education and psychosocial factors. However, a 2001 audit of over 23 000 ECD centres and service providers revealed that the field was dominated by non-governmental contributions and initiatives ("Educational Structures", 2006). Departmental provisions mainly seemed to cater for children from the age of three to school-going age, thus leaving an estimated 90% of children under the age of nine without access to ECD prior to attending school.

2.3. OUTCOMES BASED EDUCATION AND CURRICULUM 2005: CURRICULUM REFORMS IN SOUTH AFRICA

In March 1997, the then Minister of Education, Sibusisu Bengu announced the launch of Curriculum 2005, which not only marked a clear departure from the apartheid curriculum, but also a departure from content-based teaching and learning to Outcomes Based Education (OBE). The following section will provide a background to the basic tenets of OBE, followed by the aims and features of Curriculum 2005, a curriculum that has since been revised and incorporated into the Revised National Curriculum Statement (RNCS) in operation in the South African education system at the time of the administration of PIRLS 2006.

2.3.1. Outcomes Based Education and Curriculum 2005

Cross, Mungadi and Rouhani (2002) described OBE as a global educational curriculum reform phenomenon that was competency-based and had its origins in New Zealand, Australia, Canada, Scotland and limited areas of the United States. With few exceptions, OBE remains an experiment at different levels of national policy, as can be seen in Australia where, for example, it has become

part of a national mission with regional adaptations, or in Scotland, where it is restricted to vocational programmes within Glasgow.

Spady (1994) explains OBE as a means of clearly focusing and organizing an educational system around the essential components of proficiency that learners need by the end of their educational careers. The key elements are described as the development of a clear set of learning outcomes around which all other components can be focused, as well as the establishment of conditions and opportunities within the system that would enable and encourage learners to achieve the set outcomes (Spady, 1994).

For Botha (2002), OBE is a commonsense idea built around the notion that the quality of education should be judged by learner outcomes or results. In this regard, OBE is concerned with what is actually learnt and how well it is learnt, as measured by academic results rather than simply regurgitating what was supposed to be learnt. This idea challenges the relevance, or at least the adequacy, of traditional gauges of education quality, such as input and process, professional intentions and efforts, the characteristics of institutions and services and financial resources made available to the educational sector.

OBE is characterized as a learner-centered approach, where the emphasis is not on what the teacher wants to achieve, but rather on what the learner should know, understand, demonstrate and become (Botha, 2002). In an OBE system, both teachers and learners are focused on a predetermined result or outcome that is to be achieved by the end of each learning process. These outcomes are intended to relate to real-life needs and situations, and integrate knowledge, competence and orientations which learners need to become responsible, critically-thinking, competent adults.

The three tenets of OBE build upon the idea of a learner-centered approach to education, affirming firstly that all learners are able to learn and succeed, but acknowledging that success does not come on the same day in the same way for every learner. Secondly, successful learning promotes more successful learning and, thirdly, schools are in direct control of (some of) the conditions

that affect successful school learning (Spady, 1994). The first premise takes into account differences in the rates and styles at which learners are able to learn by not viewing those contrasts as a barrier to successful learning, and instead regarding differences in learning as a factor that must be kept in mind in the design of any instructional process. The second tenet assumes that successful learning is dependent upon learners having had a strong cognitive and psychological foundation of prior learning success. The third tenet is built on the belief that those who implement OBE are capable of changing the way schools operate (Spady, 1994).

With the principles and tenets of OBE in mind, Curriculum 2005 not only meant a departure from content-based to outcomes-based teaching, it also marked a departure from racially-based prescribed sets of learning objectives to learner-centered teaching and associated learning strategies. According to an outcomes-based curriculum, traditional subjects are not an adequate basis for framing or encapsulating everything that should be taught or learnt. In light of this belief, Cross et al. (2002) outline what Curriculum 2005 tried to achieve as follows:

- Align school goals with workplace, social and political goals
- Use experiential and cooperative learning strategies
- Develop citizens with imaginative and critical problem-solving skills
- Acknowledge diversity of values in race, gender and culture.

According to these guidelines, Curriculum 2005 identified eight Learning Areas as a way of breaking away from traditional subject boundaries between school subjects, while integrating within and across the different disciplines and organizing the core curriculum. Traditional subjects are therefore accommodated within eight newly specified Learning Areas, namely Arts and Culture, Language, Literacy and Communication, Economic and Management Sciences, Human and Social Sciences, Life Orientation, Mathematical Literacy, Mathematics and Mathematical Sciences, Physical and Natural Sciences and Technology.

To encourage further integration between the different Learning Areas, and integration between all teaching and learning, critical outcomes were developed, proposing, among other objectives, that learners should be able to do the following:

- Communicate effectively using visual, mathematical and language skills, either orally or in writing
- Identify and solve problems creatively and through critical thinking skills
- Organize and manage themselves and their activities responsibly and effectively
- Collect, analyze, organize and critically evaluate information
- Understand that the world is a set of related systems and those problem-solving contexts do not exist in isolation.

The critical outcomes provide guidelines for each of the Learning Areas, with specific outcomes also formulated to refer to the specific knowledge, attitudes and understanding that should apply to a specific context. Assessment criteria provide evidence that learners have achieved these specific outcomes and serve as indicators of the observable progress and products of learners' achievement. According to Cross et al. (2002), the Department of Education put learning programmes in place as sets of activities in which learners could engage in the achievement of specific outcomes.

2.3.2. Critique of OBE and Radical Educational Reform

The OBE model was proposed as the possible cure for lack of quality education in the South African educational system. Botha (2002) is of the opinion that it can be successful so long as it is implemented in a realistic manner, giving both schools and teachers ownership of the content of the curriculum and the process of implementation. Botha (2002) also states that learners may be empowered if they are allowed the opportunity to engage rationally, reflectively and imaginatively in educational matters. Ironically, this pre-condition is

precisely what advocates of OBE assume such an approach to education would achieve.

On the other hand, some aspects of OBE have met with opposition and objections. According to Spady (1994), questions and concerns centre around nine distinct, but interrelated themes, namely:

- What exactly constitutes an outcome
- Whether outcomes are of real substance or mere symbolism.
- What precisely OBE is, since substantial controversy is caused by debates around pinpointing outcomes and their substance.
- Governmental control and accountability, where it is believed that government could be overstepping its bounds by requiring learners to demonstrate what they have learnt as conditions for promotion.
- Philosophies and worldviews that differ in viewpoints about children, families and schools. Advocates of OBE have a very optimistic viewpoint about children and believe that they are able to accomplish when inspired, stimulated and challenged appropriately. On the other hand, critics of OBE tend to oppose change from systems that are currently functional and clearly understood, within existing operational structures and curriculum focus.
- Cost versus effectiveness.
- What is proven versus what is regarded as experimental.
- Standards versus success, where the perception is that OBE lowers standards in order for learners to achieve success.
- Instructional opportunities that match the slowest learner in an attempt to equalize achievements and success of every learner.

In South Africa, OBE has not been handed down and accepted uncritically, nor has its introduction been met with the same optimism and idealism as stated by Botha (2002). Its origins can be traced within the labour movement that sought to change the education system to incorporate an integrated approach to education and training (Cross et al., 2002). In this regard, the largest labour union in South Africa, COSATU, and the National Training Board (NTB)

produced a policy document which laid the basis for training, curriculum and assessment. For the NTB, growth in South Africa required the use of technology, which in turn required an educated labour force, literate in mathematics and science and an attitude of flexibility, versatility, problem-solving skills and teamwork abilities. The primary focus for these two organizations was on labour and the training sector, since both organizations were concerned with improvement and accreditation of labour skills in the workplace. COSATU discussed the issue of competency based education as the instrument to provide training and accreditation in the labour sector. Thereafter, proposals for an integrated approach to education and training gained popularity in the education field and soon schools were incorporated in the NTB's and COSATU's proposed framework (Cross et al., 2002).

According to Cross et al. (2002), much of the debate surrounding a competency-based system was largely conducted within the labour movement and business communities, resulting in little or no integration with educational ideas and aspirations. The OBE system resonated with COSATU and the NTB, while its philosophy dominated the NQF, and the curriculum framework for Curriculum 2005, with the difference being that 'competencies' were framed as 'outcomes'. Cross et al. (2002) point to the danger that these developments and debates took place without an explicit realization that education could easily dissipate into a 'melting pot' of training and skills development associated with the labour market.

Jansen (1998) argued that OBE was doomed to fail in the South African educational system, since it was driven by politics and policy and was far removed from the realities of classroom life in the average classroom. Jansen (1998) felt the language associated with OBE was complex and confusing. A teacher wanting to make sense of OBE would be confronted by more than 50 different concepts and labels and would have to keep track of changes in meaning and priorities afforded to these terms over time. For example, the concept of 'outcomes' can only be understood when one understands what is meant by 'competencies', 'unit standards', 'learning programmes', 'assessment criteria' and 'specific outcomes'.

He (Jansen) predicted that OBE was destined to fail in the South African educational system since it is based on flawed ideas and assumptions about what happens inside schools, how classrooms are organized and what kinds of teachers exist within the system. Claims that OBE is a system characterized by flexible, collaborative, outcomes-based and empowerment-oriented approaches to learning suggests that highly qualified teachers exist to make sense of such a challenge to existing practice. The policy requires not only the application of skill, but also an understanding of its theoretical underpinnings and the capacity to transfer skill and understanding to different learning contexts (Jansen, 1998). Jansen (1998) also criticized OBE as trivializing content, even as it claimed to have the potential to move away from the content coverage found in the current education system. In this regard Jansen (1998) stated that: “Children do not learn outcomes in a vacuum. Curriculum content is a critical vehicle for giving meaning to a particular set of outcomes…Content matters.” (p.327).

Cross et al. (2002) echoed this argument by stating that Curriculum 2005 fell short of setting up an effective curricular framework for teachers and learners, since it focused too much on outcomes and neglected issues of content that were left to individual teachers to construct. Cross et al. (2002) referred to Curriculum 2005 as a bureaucracy-driven process of reform, resulting in deficiencies not only in content at the expense of outcomes, but also in terms of imposing a highly regulated framework, whilst being too closely aligned to socio-economic concerns at the expense of pedagogy.

The review of the first five years of curriculum reform in South Africa was met with pessimism, a pessimism that interpreted the reform as a drastic phase of politics, with frameworks and policies justified as questions of priorities, while the leadership of the day attempted to establish an identity and a new state representative of the interests of the majority. Regardless of the degree of pessimism from whichever point of view, Cross et al. (2002) stated that there seemed to be a general consensus that the criticism, pessimism and critique associated with OBE and Curriculum 2005 were symptomatic of the problems facing educational reform in South Africa.

2.3.3. Review of Curriculum 2005 and the Current Revised National Curriculum Statement (RNCS)

Curriculum 2005 came under review in 2002 as a result of the Department of Education's appointment of the Policy Review Committee. The task of the committee was not to dispense with Curriculum 2005 or to question the OBE approach adopted by the South African educational system, but rather it was challenged to investigate how enabling Curriculum 2005 had been in the achievement of educational and societal goals, how implementable it was and whether it was a good basis for achieving its stated critical outcomes.

Cross et al. (2002) summarize the committee's proposals as follows:

- A revised and streamlined outcomes-based curriculum framework based on integration and conceptual coherence consistent with a human rights approach.
- A national teacher education strategy aimed at instituting teacher development and preparation for the new curriculum within higher education. Ultimately, the strategy should result in the identification, selection and training of a special cadre of curriculum trainers working with non-governmental organizations and higher education institutions for short-term orientation.
- The increased production of learner support materials and textbooks.
- Budgeting for the curriculum.
- Reorganization of curriculum functions within the Department of Education and the different provinces.
- Relaxation of the pace of implementation.
- A managed process of phasing out Curriculum 2005 and phasing in a newly revised Curriculum 21, to become later known as the Revised National Curriculum Statement (RNCS).
- The appointment of a task team to manage the phasing in and out of the different curricula.

Following on the work of the Review Committee, a paradigm shift seemed to appear in respect of the ways in which curriculum change and implementation were conceptualized. These ideas included a change towards an increasing concern with the role of schools in society, the concern with returning to the 'basics' of curriculum organization and delivery, the importance of cognitive knowledge and a return to pedagogical issues, despite the existence of a progressive pedagogy embedded in an OBE system (Cross et al., 2002).

Based on the Review Committee's work, the Revised National Curriculum Statement (RNCS) (Department of Education, 2002) emerged and established its Learning Outcomes as not only critical but also developmental outcomes. The developmental outcomes for learners from Grade R to 9 ("RNCS Grades R-9", 2002) envisage learners who would be able to reflect on and explore a variety of strategies to learn more effectively, while also being able to participate as responsible citizens in the life of local, national and global communities. The developmental outcomes portrayed learners as culturally and aesthetically sensitive across a range of social contexts, and described learners who could explore education, career and entrepreneurial opportunities.

2.4. THE LANGUAGE PROFILE OF SOUTH AFRICA

During the apartheid era, South Africa had two official languages, namely English and Afrikaans. The end of the era brought about a new Constitution that gave official status to 11 local languages, nine of which were indigenous. Mesthrie (2002) clustered the predominant languages and stated that these clusters denote a set of varieties that are closely related along linguistic lines:

- Nguni, consisting of isiZulu, isiXhosa, SiSwati, Xitsonga and isiNdebele
- Sotho, made up of Sepedi (Northern Sotho), Sesotho (South Sotho) and Setswana

Apart from the clusters as identified by Mesthrie (2002), Tshivenda, Afrikaans and English complete the set of officially recognized languages in South Africa.

Table 2.4 (below) provides an indication (as taken from Mesthrie, 2002) from the 1996 Census, of numbers and percentages of people reporting each of the official languages in South Africa as their own language:

Table 2.4: Distribution of Home Language in South Africa

Language:	Numbers:	Percentage:
Nguni		
isiNdebele	586 961	1.5
SiSwati	1 013 193	2.5
isiXhosa	7 196 118	17.9
isiZulu	9 200 144	22.9
Xitsonga	1 756 105	4.4
Sotho		
Northern Sotho	3 695 846	9.2
South Sotho	3 104 197	7.7
Tswana	3 301 774	8.2
Other official languages		
Tshivenda	876 409	2.2
Afrikaans	5 811 547	14.4
English	3 457 467	8.6
Non-official languages	228 275	0.6

Based on numbers derived from the 1996 and 2001 census (Statistics South Africa, 2001), Figure 2.1(below) provides an indication of the estimated percentage of census population reporting each of the 11 official languages, as well as changes in these estimations observed between 1996 and 2001.

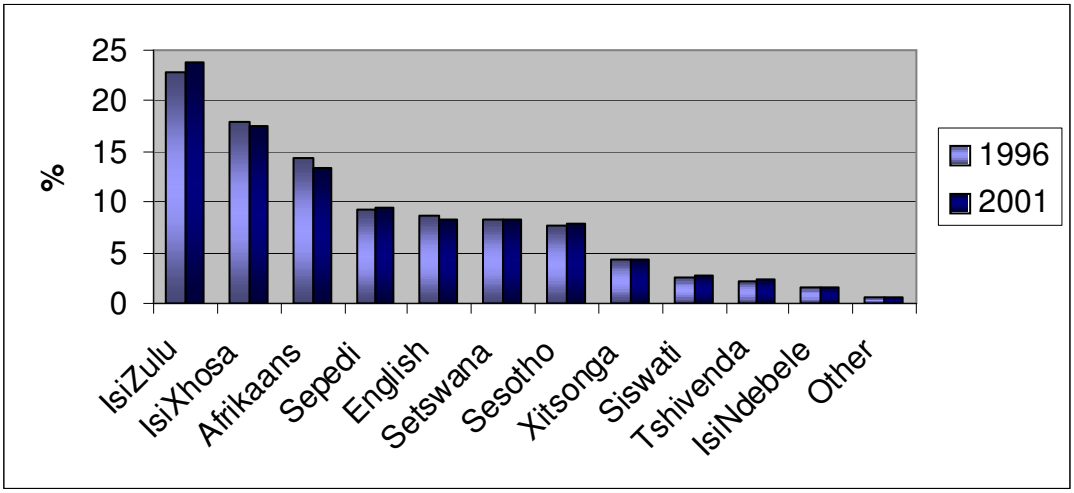


Figure 2.1: Percentages and Changes in Home Languages Spoken Between 1996 and 2001

Three quarters of the South African population are Black, but this category of people is neither culturally nor linguistically homogenous. According to “The languages of South Africa” (2007), many of South Africa’s indigenous people share an original common ancestry, but as time passed, clans, groups and communities diverged and separated in attempts to gain autonomy and more fertile pastures for livestock, thus resulting in the development of variations in the common languages.

IsiZulu, isiXhosa, isiNdebele, Xitsonga and SiSwati are collectively known as the Nguni languages due to similarities in syntax and grammar. IsiZulu is spoken as a home language by around 9.2 million people, thus forming the largest language grouping and found predominantly in the provinces of KwaZulu Natal, Mpumalanga and Gauteng. Numerically, isiXhosa closely follows as a language spoken by approximately 7.2 million people, largely residents of the Eastern Cape and Western Cape. Of the Nguni languages, SiSwati and isiNdebele are the less-used languages, and not spoken in as many areas of South Africa, or by as many people as isiZulu and isiXhosa (“The languages of South Africa”, 2007).

SiSwati (also referred to as Swazi) is spoken by approximately 1.0 million people, mainly located in the Mpumalanga region. A number of isiNdebele communities originated in the former homeland area of Ndebele, but have spread to include areas of the Gauteng and southern Mpumalanga region. IsiNdebele is only spoken by an estimated 0.6 million people as a home language (“The languages of South Africa”, 2007). Xitsonga (also known as Shangaan), a language also found towards the northern regions of Limpopo, is spoken by about 1.8 million people.

The Sotho languages make up the second grouping of African languages in South Africa and include Sepedi, Sesotho and Setswana. Sepedi, also known as Northern Sotho, is mostly spoken in the northern provinces of South Africa by approximately 3.7 million people. In contrast, Sesotho (or Southern Sotho) was originally the official language of the Kingdom of Lesotho, but over time its speakers moved to the Free State and southern Gauteng. Sesotho is the

mother tongue of approximately 7.7% of South Africans, or about 3.1 million people ("The languages of South Africa", 2007). Tshivenda, one of the smaller African languages, is spoken as a home language by approximately 0.9 million people mostly in the northern regions of the country.

South Africa's white population descends largely from the colonial immigrants of the late 17th, 18th and 19th centuries from Europe. Linguistically it is composed of Afrikaans and English-speaking groups. English is generally understood in all regions of the country and is the language most commonly used in official, commercial and public life ("The languages of South Africa", 2007). Despite the fact that nearly 3.5 million people use English as their home language, it is only ranked joint fifth out of 11 languages as a home language. Afrikaans, a language that has its roots in Dutch, is spoken by nearly 6 million people as a home language.

2.5. LANGUAGE-IN-EDUCATION POLICIES

With the inclusion of language in the proposed investigation, this study does not become a linguistic study. However, language policies are elaborated upon in this section since they may be relevant to the current state of reading achievement among Grade 5 learners in South African schools. After much debate, discussion and public comment, the national Department of Education announced the Language in Education Policy (dated 14 July, 1997). Two policies were announced, namely:

- The Language in Education Policy in terms of Section 3 (4) (m) of the National Education Policy Act, 1996 (Act 27 of 1996).
- The Norms and Standards regarding Language Policy published in terms of Section 6 (1) of the South African Schools Act, 1996.

These two policies had different objectives, but both deserve mention here since they complement each other and do not function in isolation from one another.

2.5.1. The Language in Education Policy in terms of Section 3 (4) (m) of the National Education Policy Act, 1996 (Act 27 of 1996).

In the preamble of this policy document ("The South African National Educational System Language Policy", 1997), it is recognized that the cultural diversity of South Africa is a national asset. With this asset in mind, the Language in Education policy aimed at promoting multilingualism and the development of all 11 official languages specified in the South African Constitution. The policy was therefore meant to facilitate respectful communication across language, colour and regional barriers. This approach was in line with global norms where individual lives and societies are seen to be characterized by multilingualism. The policy stated that learning of more than one language should be general practice and principle in South African society.

The Language in Education Policy ("The South African National Educational System Language Policy", 1997) states further that its underlying principle is to maintain home language(s), while providing access to the effective acquisition of additional languages. The Department of Education therefore was to follow an additive approach to promoting bilingualism from a mother tongue base.
In terms of languages as school subjects, the policy stated the following for the Foundation and Intermediate Phases:

- All learners shall be offered at least one approved language as a subject in Grade 1 and Grade 2 (p. 2)
- From Grade 3 onwards, all learners shall offer their language of learning and teaching (LOLT) and at least one additional approved language as subject (p.2),
- All languages shall receive equal time and resource allocation (p. 2)
- Promotion requirements in Grade 1 to Grade 4 are based on performance in one language and Mathematics (p. 2),
- From Grade 5 onwards one language must be passed for promotion (p.2),
- The provincial departments of education determine the level of achievement required for promotion (p.3),

- Any LOLT in a public school in South Africa must be an official language as set out in the Constitution (p.3).

Kamwangamalu (2001) summarized the aims of the Language in Education policy as promoting additive multilingualism, which meant the maintenance of home language while providing access to additional languages. The policy is also aimed at promoting all 11 official languages, while addressing disadvantages resulting from mismatches between home language and LOLT. Lastly, the policy aims to develop programs for the redress of previously disadvantaged languages.

The logic of the Language in Education Policy is based on the recognition that South Africa is a multilingual society and that mother tongue is the most appropriate language of learning. According to Heugh (2000), although the policy recognizes that the learner will need a strong proficiency in at least one other language and that of most learners, English will be a language of high priority. Bilingual or multilingual education is conceptualized as adding a second or even a third language to the learner's repertoire, in order to promote academic and linguistic success. The policy neither prevents access to English, nor diminishes the learner's opportunity to engage meaningfully in English. Instead, the policy offers the use of English a much better opportunity for expansion as medium of communication (Heugh, 2000).

According to Barkhuizen and Gough (1996), the Language in Education policy is composed of two interrelated components, namely decisions about what languages should be taught as subjects, and decisions about languages used as media of learning. With regards to language as subject, the notion of a common, core syllabus underlying the goals and design of all languages emerged at the time of national and regional level discussions in formulating the 'Language in Education' policy. In principle, a core syllabus would specify the objectives of all language instruction and emphasize the role of the teacher as being that of teaching language rather than as a teacher of a specific language.

Graphically, the Language in Education policy and how it was planned can be illustrated as in Figure 2.2.

With regards to the language of learning, support was garnered for a bilingual language-of-learning policy, which was considered essential for promoting a national additive bilingualism in which one of the languages of learning would typically be an African language. Barkhuizen and Gough (1996) illustrated that in the past, typically, children with an African language as mother tongue, Coloured and Indian children had to learn through the medium of a second language. White children, on the other hand, were taught in their mother tongue.

Seen against this instructional practice, the concept of additive bilingualism is favoured, because it is likely to promote multilingualism and the development of specifically African languages. The RNCS (2002) states that, specifically for the Language Learning Area, a curriculum is provided that follows an additive approach to multilingualism. With such an approach, all learners learn their home language and at least one additional official language. This structure allows for them to become competent in an additional language, while their home language is maintained. The RNCS (2002) states explicitly that the LOLT should be the learner's home language, particularly in the foundation phase, when children learn to read and write for the first time.

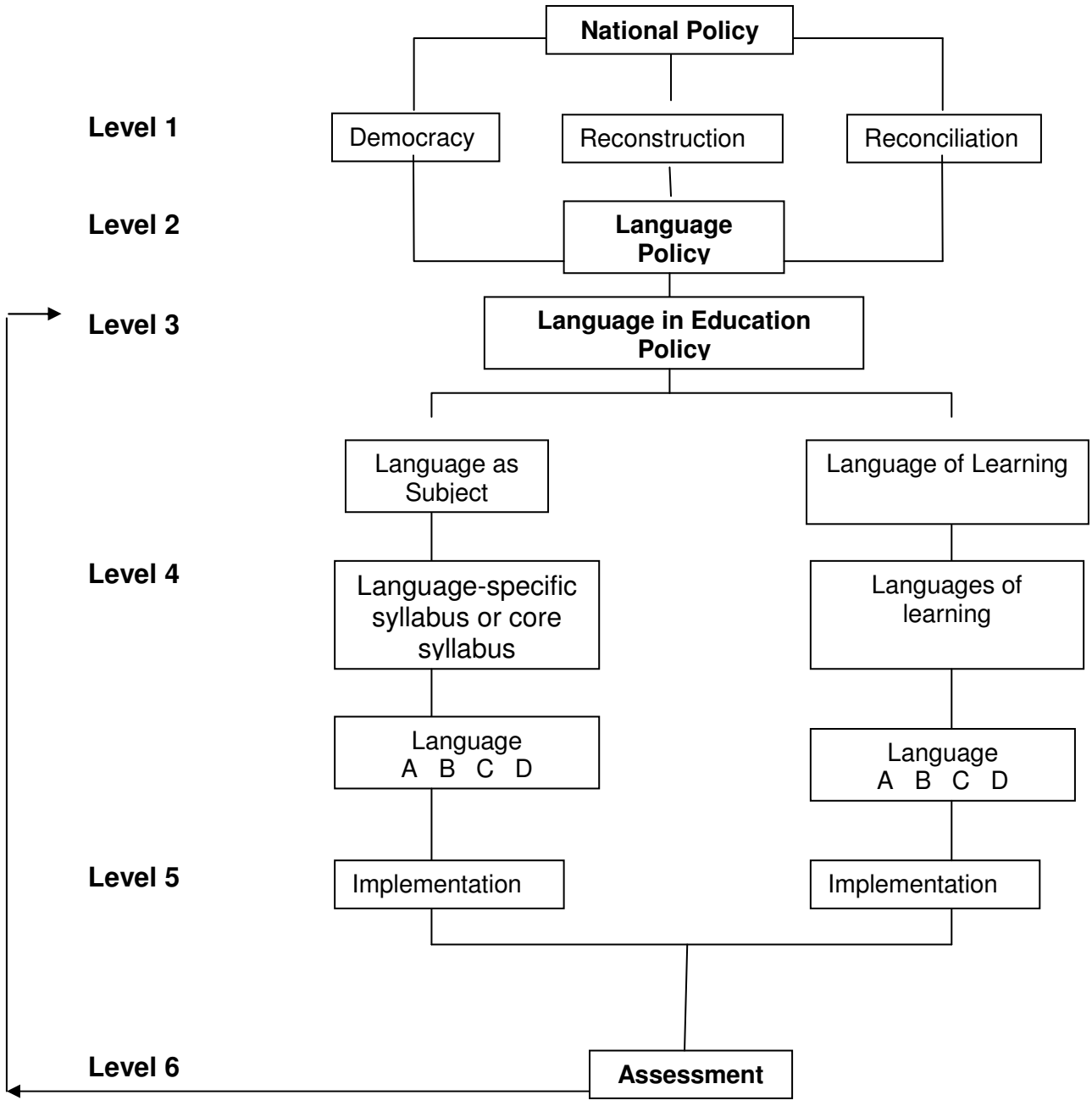


Figure 2.2: Language in Education Policy Planning (Barkhuizen et al, 1996, p. 456).

2.5.2. The Norms and Standards regarding Language Policy published in terms of Section 6 (1) of the South African Schools Act, 1996.

According to policy documents, the Norms and Standards with regards to Language Policy aim to protect, promote, fulfill and extend the individual's language rights and means of communication in education ("The South African National Educational System Language Policy", 1997). Similar in purpose to the National Education Policy Act, this act promotes bilingualism or multilingualism, and aims to redress the neglect of historically disadvantaged languages in school education.

The norms and standards aim to protect the rights of individuals by means of the following principles:

- The parent of the minor learner has the right to exercise language rights on behalf of the learner
- The Department of Education has the responsibility to provide the learner with the option to choose the language of teaching, upon application for admission to a particular school
- In cases where the particular school uses the LOLT chosen by the learner and should there be place available, the learner must be admitted
- In cases where no school in a district offers the desired language as medium of instruction, the learner may request the provincial department to make such provision.

2.5.3. The RNCS Outline of the Language Learning Area

In terms of each of the Learning Areas, the RNCS defines the Language Learning Area as consisting of all eleven official languages, including South African sign language and Braille. While the curriculum document supports the use of home language as LOLT, it also provides for a second and third additional language. A second additional language assumes that learners do not necessarily have any knowledge of the language when they arrive at school, but the curriculum allows them to better learn and understand such a second

language. Literacies and skills acquired through the learners' home language are transferred to the first additional language, and the curriculum provides strong support for those wishing to use their first additional language as LOLT. A second additional language is intended for learners who wish to learn three languages, and such a language may be an official or foreign language (RNCS Grades R-9, 2002).

The Language Learning Area Outcomes that are included in the curriculum document have been written to provide focus on specific skills and knowledge. Since this study will make use of data provided by Grade 5 learners' reading ability in a language in which they have received instruction for the first three years of formal education, four Learning Outcomes related to the learner's ability to use language are of relevance.

Learning Outcome 3 refers to reading and viewing, and the learner's ability to read and view for pleasure and information, as well as responding critically to the emotional, aesthetic and cultural values in texts. Learning Outcome 4 refers to writing and the learner's ability to write different kinds of factual and imaginative texts for a wide range of purposes. Learning Outcome 5 relates to the learner's ability to think and reason using language as an instrument to access, process and use information for learning, while Learning Outcome 6 addresses the learner's ability to use sounds, words and grammar to create and interpret texts (RNCS, 2002, p. 62-75).

2.6. LANGUAGE COMPLEXITIES IN SOUTH AFRICAN SCHOOLS

The language profile of South Africa is very complicated and diverse. For the purposes of this study, a distinction is made between 'first language' and 'language of learning' (also referred to as 'language of the test' for the purposes of this study).

South African children are supposed to start their learning at school from Grades 1 to 3 in their home language (mother tongue). However, many schools

are faced with teaching learners in these grades in a language of learning that is nonetheless different from what is spoken at home. When learners approach Grade 4, the language of learning changes again, resulting in more than 80% of learners being taught in a further second language (usually English, a language spoken by less than 10% of the population). For Grades 1 to 3 learners, 'home language' does not necessarily coincide with 'language of learning' or 'language of the test'.

Figure 2.3 (below) attempts to illustrate this language complexity faced by many learners in schools in South Africa. In this example, an existing Setswana-speaking learner attends a school that teaches in isiZulu, only to switch to English as language of learning by Grade 4. For the purposes of data analysis in this study, language groups will therefore be defined by means of 'language of learning' (in Grades 1 to 3), since the term 'home language' is not accurately indicative of whether a learner receives instruction in his or her home language. Reference to 'language of learning' (Grades 1 to 3) and 'language of the test' will be used interchangeably.

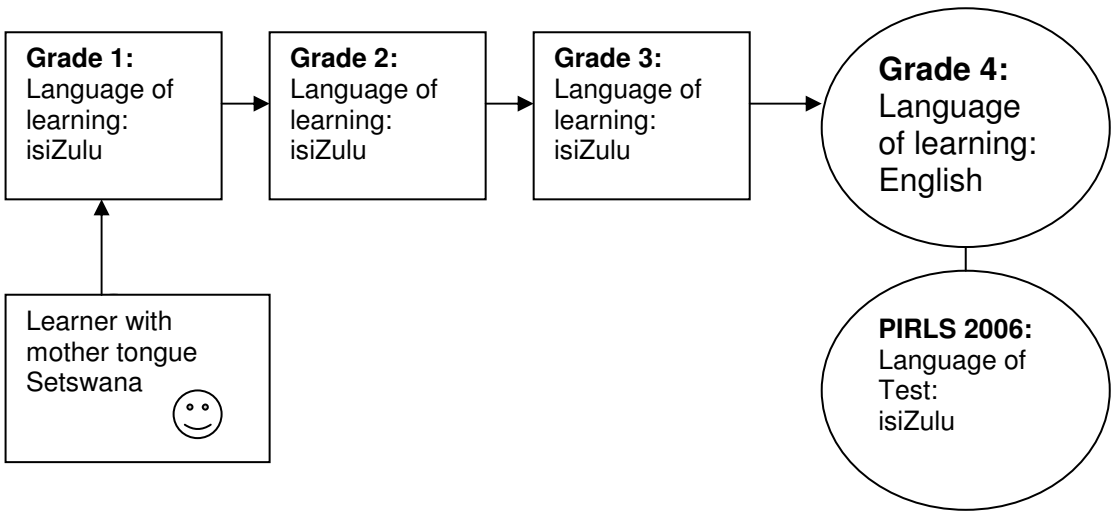


Figure 2.3: Illustration of Language Complexity in Terms of Language of Learning, Home Language and Language of the Test

A common occurrence in South Africa is therefore that individuals are proficient in more than one language. In provinces like Gauteng it is quite common and in this regard Mesthrie (2002) quotes an example taken from a 23 year-old male student from the town of Germiston as saying:

> My father's home language was Swazi and my mother's home language was Tswana. But as I grew up in an isiZulu speaking area we used mainly isiZulu and Swazi at home. But from my mother's side I also learnt Tswana as well. In my high school I came into contact with lots of Sotho and Tswana students, so I can speak those two languages as well. And of course I know English and Afrikaans. With my friends I also use Tsotsitaal.

This quotation confirms the argument of Setati, Adler, Reed and Bapoo (2002), that the majority of South Africa's teachers work in classrooms where English is the official LOLT, but that English is neither the teacher's nor the learners' main language. With the exception of texts used for teaching a specific language as a subject (for example, isiZulu or Setswana), most teaching and learning materials are printed in either Afrikaans or English. Anecdotal evidence supports this claim, as outdated Afrikaans textbooks that are not in use in urban schools have been observed in many classrooms of particular rural schools. Ironically, English and Afrikaans remain languages that are spoken as the major home language by only a minority of South Africa's teachers and learners (Setati et al., 2002).

Setati et al. (2002), supported by earlier work of Rutherford and Rollnick (1993), provide evidence of 'code-switching' and language practices in mathematics, science and English classrooms in a sample[2] of schools in South Africa. The sample consisted of ten urban and rural schools, and although findings cannot be generalized to the larger population, the study is nonetheless situated within a policy and practice environment in education in which additive bilingualism and multilingualism are advocated. These researchers make mention of

[2] 'Sample' is used here in the sense of a small data set or selection of schools rather that a random or unrepresentative sample.

contextual differences in the use of English as it occurs in urban and rural schools. They report that in their sample of rural schools, most teachers and learners (with some exceptions) shared the same non-English background. Learners in these schools typically read, wrote or spoke English only in their classroom environment. The use of textbooks was limited due either to classrooms having to share, or teachers wishing to preserve an already scarce resource, thus refraining from textbook use at all. Setati et al. (2002) came to the conclusion that, for rural schools, the use of English can be more accurately described as a foreign language rather than an additional language, since exposure to English for these learners is exclusively limited to the school environment.

On the other hand, urban schools in the sample were served by teachers who worked with learners coming from a range of main languages. This multilingual setting complicates teaching practices, but urban schools seem to be supportive of the use of English as a LOLT. Urban areas are exposed to far more examples of environmental print in English, and teachers and learners have far better access to newspapers, magazines, television and speakers of English. In an urban context, Setati et al. (2002) describe the use of English as an additional language, since learners and teachers have the opportunity to acquire the language informally outside the classroom.

Webb (2002) states that an over-estimation of English and an under-estimation of African languages as instruments of learning are major contributors to educational complexities. Cognitive development is dependent on the learner knowing the language well. Skills such as the ability to understand the central theme of a text, the ability to select relevant information and to summarize it into a new coherent whole, and the ability to recognize relations between events and abstract concepts can only occur when a learner has a sufficient grasp of a language. Generally, this requirement will only be satisfied by the learner's first language (Webb, 2002).

In spite of government's drive to promote mother tongue learning, Black parents in South Africa still prefer their children to be taught in English, as it is equated

with success, economic power and opportunity. In many cases, parents are of the opinion that the only way their children can acquire English is by using it as a language of learning. Webb (2002) poses a counter-argument to this view, by stating that if the development of cognitive skills does not take place, this deficit arises not because learners are unfamiliar with the language of development, nor because English was not acquired effectively, but because learning skills have not been developed sufficiently. Instead, by using an African language (or home language) as basis for cognitive, social and affective skills development, learning skills may be better developed, resulting in English being acquired more effectively.

In the 1990s, the then minister of education, Kader Asmal, stated that language policy was not working for all and required an immediate review. In a newspaper article dating back to May 2001, Kamwangamalu (2001) quoted the then minister's opinion that although the policy promulgated in 1997 was theoretically sound, it was not working on the ground. The succeeding Minister of Education, Naledi Pandor, attempted to explain the imperatives of the language policy, as in a press release at a language colloquium held in Cape Town on 31 July, 2006, she argued that the language policy in the South African national educational system was seeking to achieve a number of important imperatives. The language policy encouraged the use of mother tongue as a clear departure from past practice. The policy aimed to introduce a diversity of learning opportunities that had largely been unavailable to learners in the past, and promoted effective learning and teaching of previously neglected indigenous languages. For this reason, the policy was not intended to deny learners the opportunity to acquire English or another second language, but rather to empower learners by making language-learning opportunities available in all 11 official languages.

However, even then, the Minister echoed the views of her predecessor and also believed that the language policy, adopted in 1997, had not been implemented convincingly to date. Resources had not been made available to give effect to the policy, and a poor response existed due to parents' perceived fears arising from past practices of Apartheid education. In addition to this lack of

implementation, the language policy had not received a prominence similar to the profile of other policy shifts that the educational system had experienced in recent years. According to the Minister, the main obstacle faced in promoting mother-tongue learning was the preference of many parents for their children to be taught in English. To add to this obstacle, teachers had not been adequately trained to teach in English. The minister's press release also drew on the conventional wisdom that a strong mother-tongue foundation provided the most desirable platform on which to base the learning of a second language. In this regard, the Minister alluded to 'mounting evidence' that the loss of mother tongue correlated with educational difficulties experienced by learners who used another language for learning.

Webb (2002) summarized some of the language problems in South Africa as the dominance of English, where it is perceived to have more economic, social and political power than the other languages used in South Africa. Another language problem pertains to low proficiency in English, where levels of English proficiency are largely inadequate for many people in terms of the functions they have to perform. Insufficiently adapted African languages are another problem, since these still carry extremely low status and are not considered to be useful as instruments of learning, economic activity, social mobility and public business. South Africa experiences difficulties with establishing multilingualism and growing monolingualism in the use of English. There is a politicization of some languages, specifically in the unevenness of the knowledge of languages, the strong ethnic nationalism associated with Afrikaans, the generally positive socio-political meaning of English and generally negative feelings associated with the use of African languages as media of learning.

Mda (2004) identified the factors and tensions that inhibit the effective implementation of the Language-in-Education Policy, as socio-political, language status and inequalities. She echoed Webb (2002) in identifying the negation of African languages and preference for English as a negative factor, adding teacher training as a problematic factor, where methodologies for teaching different languages in higher education institutions had been separate,

so that, for example, an Afrikaans method, a Xitsonga method and a isiXhosa method may now exist rather than a language method. Another weakness in teacher training is that very few language-across-the-curriculum programmes have been established or put into practice (Mda, 2004).

Heugh (1999) made the bold statement that until learning materials are available in all the learning areas from Grades 1 to 12 in all 11 official languages and until matriculation examinations can be written in each of these languages, there will be no equality of education in South Africa. However, the language policy is based on additive bilingualism, meaning that for the majority of South African learners English is a second language of learning. In light of this function of English, Heugh (1999) advocates massive in-service teacher training to equip the majority of teachers with bilingual teaching skills and an adequate grasp of English for teaching purposes. According to Heugh (1999), teachers agree that English language proficiency of teachers is inadequate for effective teaching. Similarly, English-speaking teachers do not have the required proficiency in a second language to teach in schools where there is an additive approach to bilingualism.

The aims of the Language in Education policy of 1997, described above, stated that multilingualism should be promoted as a valuable resource. Knowledge of more than one language should be regarded as an asset in the immediate economic sense, but also in the broader social sense. The policy aimed to break down the legacy of apartheid by promoting African languages in elaboration, modernization and development of these languages. Despite the noble aims, Kamwangamalu (2001) argued that it was too early to tell the effects, if any, this campaign would have on language practices in South Africa. Despite the Constitution's principle of promoting language equity, research findings by the Language Plan Task Group (LANGTAG) indicated that there seemed to be a drift towards unilingualism in English, thereby marginalizing all other languages. In light of these findings, Kamwangamalu (2001) came to the conclusion that the inclusion of nine African languages in the Constitution seemed to be merely symbolic, and that it was becoming increasingly difficult to convince parents and learners either that multilingualism was a resource, or that

African languages could be used as medium of instruction throughout the education system. Kamwangamalu (2001) agreed with views stated by Webb (2002) in saying that it was not surprising that when presented with the following models of literacy, parents overwhelmingly opted for the third model:

1. Initial literacy in mother tongue, followed by a shift to English
2. Initial bi-literacy in English plus an indigenous language
3. Literacy only in English throughout the educational system

The complexity of the language issue becomes more apparent when reference is made to the views of Heugh (2000), which were diametrically opposed to those of Kamwangamalu and Webb. Heugh (2000) based her argument on findings of a study conducted by the Pan South African Language Board (PANSALB) in 1999, the results of which were published in 2000. According to these findings, 88% of people favour the maintenance of the home language throughout the education system, or at least the home language alongside a second language such as English. In that study, there appeared to be a high degree of support for languages other than English, as opposed to the views of Webb and Kamwangamalu who clearly stated that the preference was swinging in favour of the use of English. Despite Heugh's (2000) disagreement, the views of Webb and Kamwangamalu are not invalid. It is evident that some people and a number of parents might choose the use of English above the use of the home language. However, according to Heugh's views as stated already in 2000, the fact was that many parents opt not to make such a choice, in which case the preferences of a minority are presented as if they are valid and representative of the majority (Heugh, 2000).

Kamwangamalu's (2001) statements about the complexity of language in South Africa conclude this chapter. He offers a way forward by stating that the Language-in-Education policy should be revised to state unequivocally which official languages should be used for what purposes. It is not enough to have legislation in place that provides equal status and recognition of all 11 official languages. Instead, language policy needs to be sustained and purposefully

implemented. An egalitarian language policy does not necessarily result in equal outcomes, nor does it ensure the promotion of all languages (p.409).

CHAPTER 3: READING LITERACY LITERATURE REVIEW

"To learn to read is to light a fire. Every syllable that is spelled out is a spark."
Victor Hugo

The importance of literacy has become more evident in the 50 years since the United Nations (UN) declared literacy to be a basic human right, along with the right to adequate food, health care and housing. Literacy education has indeed become a tool to help address what might be perceived as more pressing needs for food, health care and housing.

The UN Literacy Decade was declared as 2003 to 2012, and according to UNESCO statistics, about 861 million people (or about 20% of the world's adults) cannot read or write, nor participate fully or optimally in the organization and activities of their societies. Of these illiterate adults, 70% live in Sub-Saharan Africa, Southern and Western Asia, Arab countries and North Africa, while two-thirds are estimated to be women ("Literacy", 2004).

This study proposes to identify, illuminate and explain relationships between some major factors associated with successful reading at Grade 5 level in South African primary schools. Of importance in particular are those factors that influence reading achievement at home-, class- and school-level. The remainder of chapter 3 will examine previous findings and significant background factors associated with reading literacy achievement.

3.1. DEFINITIONS OF LITERACY

A common sense definition of 'literacy' would indicate the ability to read and write. In more specific terms, literacy can be defined as the ability to both read and write a short simple statement, reflecting understanding about everyday life. Binkley and Kelly (2003) cite excerpts from the National Assessment of

Educational Progress (NAEP) study undertaken in the United States of America (USA) during 2002, to define reading literacy as follows:

> The term reading literacy is not intended to imply only basic or functional literacy. Rather, the term connotes a broader sense of reading, including when to read, how to read, and how to reflect on what has been read. (NAEP framework, 2002:8).

The United States Reading Panel, in conjunction with The Partnership for Reading and the Reading First Law, defined reading as a complex system of deriving meaning from print that requires an understanding of the connection between phonemes and print, the ability to decode unfamiliar words and to read fluently, possess sufficient background information and vocabulary to improve reading comprehension, and the development of appropriate active strategies to construct meaning from print and the maintenance of motivation to read (Report of the National Reading Panel, 1999).

According to Scherba (2003), the definition of literacy has evolved from an exclusive focus on reading and writing to encompass a more inclusive and expansive perspective. This development means that research into literacy has evolved to include aspects of diverse populations that cross cultural, political and socio-economic boundaries. Dubin and Kuhlman (1992) agree with this notion, stating that literacy has taken on meanings that go beyond the simple definitions of reading and writing. According to these authors, the word 'literacy' itself has come to mean competence, knowledge and skill. For example, common expressions such as 'computer literacy', 'civic literacy' or 'health literacy' stand for know-how and awareness of the domain of the first word in such expressions.

Hiebert (1991) follows a constructivist approach to the definition of literacy by stating:

> For some time now, a new perspective on literacy and the learning processes through which literacy is acquired have been emerging. This new

> perspective does not consist of old ideas with a new name, but rather it represents a profound shift from a text-driven definition of literacy to a view of literacy as active transformation of texts. In the old view, meaning was assumed to reside primarily within text, whereas, in the new view, meaning is created through an interaction of reader and text (Hiebert, 1991:1).

Given the reported definitions and conceptualisations, it becomes clear that reading literacy can be regarded as one of the most important abilities learners acquire as they progress through their early school years. As a foundation for learning across all subjects, literacy can be used for recreation and personal growth, while simultaneously providing young children with the ability to participate more extensively in their communities and societies.

Fuchs and Woessmann (2004) refer to the definition of reading literacy offered by the Organization for Economic Co-operation and Development (OECD), as the capacity to understand, use and reflect on written texts in order to achieve one's goals, to develop one's knowledge and potential and to participate in society. Reading literacy is therefore not understood as a basic skill, but rather as a goal, while at the same time also being a functional means of education and individual development, within and outside school, in the individual's current and later life, in further education, at work and in leisure activities (Linnakyla, Malin & Taube, 2004). Viewing literacy as a social practice means that reading represents a multitude of evolving human activities with language at its centre (Landis, 2003). According to Frost, Madsbjerg, Niedersee, Olofsson and Sorensen (2005) reading is an activity used for interpersonal communication, but is also dependent on intrapersonal sources such as motivation, attention, imagination, memory, comprehension and language.

Most current theories of reading development stress the fundamental importance of phonological skills to learning to read, (e.g. Nation & Snowling, 2004), while Wood, Hill, Meyer and Flowers (2005) have noted that phonemic awareness, vocabulary and fluency variables seem essential for effective prediction of reading achievement. Others, such as Beech, (2005) and Hempenstall (2004), argue that reading literature has paid specific attention to

how children progress through different phases of reading according to defined stages of development.

For both industrialized and developing countries, literacy education is near the top of the policy agenda. UNESCO's estimates of illiteracy figures worldwide remain high, while the prospects of a radical reduction seem unlikely. Despite these low literacy levels across the globe, the relative costs and benefits of literacy programs are as yet poorly understood. Yet, literacy is of central importance to development ("Literacy and International Development", 2004). Increasingly, the attainment of literacy is correlated with higher levels of income and job productivity. Baydar, Brooks-Gunn and Furstenburg (1993) support and explain this notion by stating that levels of literacy of individuals and societies are often taken as indicators of well-being, since low levels of literacy have been linked to low productivity, high unemployment rates, low earnings and high rates of welfare dependency, and teenage parenting.

The consequences for learners who cannot read or who struggle to read in the early grades are well documented. Leslie and Allen (1999) cite Juel (1988), who reported that 88% of American children who scored in the lowest quartile for reading comprehension in Grade 4 remained below the 50th percentile for reading at the end of the fourth grade.

Donald, Condy and Forrester (2003) report that despite structural transformations that have taken place in post-apartheid South African society and its education system, many schools still face educational disadvantages, making the adequate development of literacy skills a national priority. Generally under-resourced schools, extensive poverty, unemployment and teacher under-qualification result in generally low standards of scholastic progress, achievement, high failure and attrition rates, and hence in inadequate development of literacy for the learners concerned.

For the purposes of this study, the PIRLS 2006 definition of reading literacy is applied. In naming its 1991 study, the IEA decided to join the terms 'literacy' and 'reading' to convey the notion that literacy includes the ability to reflect on

what is read and to use reading as a tool to achieve personal and societal goals. Thus, according to Campbell et al. (2001), the framework for literacy that applies to PIRLS is as follows:

> ...the ability to understand and use those written language forms required by society and [or] valued by the individual. Young readers can construct meaning from a variety of texts. They read to learn, to participate in communities of readers and for enjoyment. (Campbell et al., 2001:3).

With this definition of reading literacy, the PIRLS 2006 framework takes the stance that reading literacy is a constructive and interactive process. According to Brinkley and Kelly (2003), the reader is now regarded as actively constructing meaning and as knowing effective reading strategies. Such readers have positive attitudes towards reading and read for the purposes of recreation and information acquisition. Meaning is constructed in the interaction between reader and text, in the context of a particular reading experience. Reading implies that the reader brings with him or her a repertoire of knowledge, skills, cognitive and metacognitive strategies. This definition of reading literacy as used by the IEA is used as conceptual foundation of reading for the purposes of this study and its use of the South African PIRLS 2006 data as data source.

3.2. READING LITERACY AS CONCEPTUALIZED BY THE RNCS

In South Africa, ongoing concerns surrounding the development of learners' literacy skills drive the literacy teaching and learning research landscape. Concerns associated with learners' development of basic literacy skills at the foundation levels of education (Bloch, 1999; Lessing & de Witt, 2005), concern about their acquisition of more advanced literacy skills in high school (Matjila & Pretorius, 2004; Pretorius & Ribbens, 2005), and concerns about the development of advanced literate language skills needed for tertiary level education (Pretorius, 2002), are all consistently reflected in research.

The Revised National Curriculum Statement (RNCS), as issued by the National Department of Education in South Africa, professes to follow a balanced

approach to literacy development. Such a balanced approach recognizes that learners, upon entering their formal schooling years in Grade R, arrive at school with prior knowledge and a high proficiency in their home language, developed through a range of interactions with others at home in the context of nurturing, care and play ("RNCS Grades R-9", 2002).

The principle that guides the teaching and learning of literacy in the national curriculum statement is that language development is a gradual process of improvement. Increasingly, learners' language will become more accurate as they are afforded more opportunities to use and develop their language knowledge and skills. With this principle in mind, the balanced approach to literacy begins with children's emergent literacy and involves their reading books and writing for real life purposes while also paying attention to phonics. With regards to reading, the RNCS states that the move is away from the 'reading readiness approach', which held that children were not ready to start learning to read and write until they were able to perform skills such as auditory discrimination and visual discrimination, and had sufficiently developed fine and large motor skills. The balanced approach to literacy as stated in the RNCS emphasizes that these skills should not necessarily have to be in place for a learner to start reading and writing. Instead, these skills should be developed during children's early learning experiences.

The RNCS encourages learners in the Foundation Phase (that is from Grade R-3) to do wide reading, while teachers should provide learners with opportunities for writing and developing their vocabulary and language use. Learners should be helped to discover techniques and strategies to unlock the 'code' of the written word, such as developing word recognition and comprehension skills by means of phonemic awareness, knowledge of letter-sound correspondence and knowledge of blending, which is described as the ability to put two or three letters together to make a sound.

At the end of the Foundation Phase, the balanced approach to reading literacy as outlined in the RNCS culminates in the Grade 3 learner having been

exposed to Reading and Viewing as a Learning Outcome, resulting in abilities to:

- Use visual cues to make meaning (e.g. read graphical texts such as photographs, maps and diagrams) (p.33)
- Make meaning of written text (e.g. comment on stories or poems that were read and show understanding by answering questions on main ideas, key details, cause and effect, conclusions and personal opinions) (p.33)
- Read texts alone, and use a variety of strategies to make meaning (p.35)
- Consolidate phonic knowledge (e.g. recognize that the same sound can be spelled in different ways or recognize that the same spelling can represent different sounds) (p.37)
- Read for information and enjoyment (e.g. choose a variety of books to read and state what was liked or not about them) (p.39).

3.3. FACTORS ASSOCIATED WITH READING ACHIEVEMENT AT LEARNER, HOME AND SCHOOL-LEVEL

Worldwide, studies into the factors that affect learner achievement have been undertaken in a variety of ways. The following section outlines the findings of a number of these studies from both developed and developing countries. Given this outline of already existing literature, it will attempt to fill the gaps and add to the body of literature on factors associated with learner achievement, specifically in a developing context with learners from diverse social- and language backgrounds.

Strickland, Ganske and Monroe (2002) compiled a list of what is known about successful readers and writers. According to these authors, successful readers have normal to above average language skills and have opportunities to identify letters and environmental print. Children who are to become successful readers have exposure to adults who involve them in purposeful literacy experiences during early childhood years and have as a result a fair amount of pleasurable,

motivating early childhood experiences with books and literacy. Successful readers are likely to be influenced by responsive adults who listen and talk to them, and are likely to engage in activities such as rhyming and singing, thus creating an awareness of the internal structure of spoken words. Successful readers are likely to attend schools that provide learners with frequent and intensive opportunities to read and write, while building upon early childhood experiences with opportunities for learners to learn the nature of the alphabetic system. Successful readers have overall progress that is steady and sure, despite periodic difficulties, and have the ability to build on informal experiences with literacy from early years as they encounter more formal and complex tasks.

Postlethwaite and Ross (1992) refer to effective schools as those whose learners undertake substantial reading in their free time, take out books from the library and have the habit of reading out loud and spending more time on reading homework.

When it comes to what is known about learners at risk of failure in English speaking contexts, some factors pertain to the child's personal development, others to the group or situation in which they reside. Children who are particularly at risk of encountering reading difficulties typically have a history of preschool language impairment, limited proficiency in English or come from homes where a nonstandard dialect of English is spoken. Learners at risk often have parents who had difficulty learning to read, are likely to come from poor neighbourhoods and attend schools in which classroom practices are deemed ineffective. Strickland et al. (2002) point out, however, that none of these factors are automatic barriers to literacy, and these factors do not function in isolation but rather as composite factors of reading difficulties.

The following sections will pay particular attention to those factors associated with learners that influence reading literacy achievement, in particular the homes from which they come and the schools they attend.

3.3.1. Learner Factors

The RNCS of South Africa envisages learners who, upon exposure to the formal education system, will develop into individuals who will act in the interests of society, based on respect for democracy, equality, human dignity, life and social justice ("RNCS Grade R-9", 2002). Through exposure to the curriculum, the education system in South Africa seeks ultimately to create lifelong learners who are confident and independent, literate, numerate, multi-skilled, compassionate individuals, with respect for the environment and an ability to participate in society as critical and active members.

This study analyzes data as it pertains to Grade 5 learners who are roughly midway through the Intermediate Phase of the South African education system. Typically, learners in this phase are on the brink of adolescence and could be described as self-conscious and responsive to peer influence, with a curiosity as to who they are and what they want to become. The RNCS ("RNCS Grade R-9", 2002) provides a profile of learners in the intermediate phase, beginning at Grade 4:

- Learners from Grade 4 onward are more sensitive to how their actions affect others (p.55)
- They are able to consider the needs, opinions and points of view of others (p.55)
- They find it increasingly easy to function co-operatively in groups on a given task (p.55)
- At the same time, learners enjoy independence and working on their own (p.55)
- They begin to show the desire to take control of their own learning (p.55)
- These learners become more methodical and deliberate in their approaches to learning (p.55)
- They are increasingly able to access, record and manipulate information (p.55)
- Learners from Grade 4 onwards are increasingly able to investigate, compare and access information critically (p.55)

From Grade 4 onwards, learners consolidate and extend their literacy skills and build their confidence and abilities to use language more fluently. Given this learner profile, factors related to learners' reading achievements are centered on reading motivation and reading-related self-perception. Leino, Linnakyla and Malin (2004) state that learners who spend substantial time reading on their own tend to be better readers than those who devote more limited time to reading. On the other hand, Chapman and Tunmer (2003) argue that reading self-concept and reading self-efficacy appear to develop in line with initial experiences of learning to read.

For children who experience initial or continued success or difficulty in reading, relationships between reading achievement and self-perception (referring to those perceptions, values, knowledge, and beliefs individuals have about themselves as learners) arise within the first year of schooling. This timing means that the learner's self-perception forms in response to emerging patterns of accomplishment or difficulty with learning tasks (Chapman & Tunmer, 2003), so, for example, learners with a low sense of efficacy for completing reading tasks tend to give up more easily, engage in off-task activities or avoid the task altogether.

Linnakyla et al. (2004) are in agreement when stating that learner-related factors associated with low achievement can be significantly attributed to learners' self-concept in reading, their expected further education and the number of books at home. These authors identify another significant factor related to the learners themselves, namely their interest and engagement in reading on their own. Where learners are not interested in reading, where they only read when they have to, or where reading is regarded as a waste of time, reading achievement is at risk of being significantly lower.

Resonant with research that associates learner-related factors with low achievement is the work of Wallner-Paschon (2009), who refers to the process of 'reading socialization'. Important fields of socialization for the learner are the school, family and peer group, all of which in turn affect the learner's

motivational characteristics, such as reading attitude and reading self-concept, as well as reading achievement.

Gambrell, Palmer, Codling and Mazzoni (1996) refer to the work of inter alia Veenman (1984), who reported that teachers ranked motivating learners to read and creating interest in reading as amongst their primary and overriding concerns. Turner (1995) refers to motivation and cognitive engagement interchangeably as voluntary uses of high-level, self-regulated strategies, such as planning, paying attention, connecting ideas, judging and monitoring. Motivation is crucial to reading at any level and beliefs about reading have an important relation to understanding and engagement during reading. Schraw and Bruning (2000) state that positive beliefs about reading translate into higher levels of motivation and better understanding of what is read. This in turn is a positive consequence of cognitive engagement (Turner, 1995).

A slightly different perspective is that of Wigfield, Guthrie, Tonks and Perencevich (2004), who argue that even the readers with the strongest cognitive skills may not spend much time reading if they are not motivated to do so. Thus, intrinsic and extrinsic concepts of motivation to read influence the frequency and comprehension with which a learner will tend to read. Intrinsic motivation propels the learner to complete the reading task for its own sake and out of interest in the activity. Such learners are characterized by curiosity and preference for challenge. When extrinsically motivated, on the other hand, learners may perform activities for the sake of receiving rewards or some benefits. Wigfield et al. (2004) describe these two forms of motivation in contrasting terms, emphasizing the need for fostering among learners of intrinsic motivation to read. Despite the fact that intrinsic motivation helps the growth of reading skills and can lead to long term engagement in reading, learners of a young age are unlikely to be largely intrinsically motivated and will rather vacillate between intrinsic and extrinsic motivations for reading.

This study also includes among the factors the characteristics associated with learners' languages and the role these languages might play in reading achievement. The reality for most learners in South Africa is one of reading in a

second language once they progress to Grade 4. Prior to Grade 4, the premise is that learning to read took place in their mother tongue (or first language). Howie (2003) alludes to the South African educational system being faced with the challenge of providing quality education to a multi-cultural learner population speaking 11 different languages. English as a first language is spoken by less than 10% of the population, and though one of the languages most used in schools (the other being Afrikaans), it is not the most widely spoken language of the home. Thus, the challenge of second language acquisition, mastery and learning is a reality for a majority of learners in South Africa. Admiraal, Westhoff and de Bot (2006) refer to such a phenomenon as one of 'immersion', where a language that is not that of the larger society is used as a medium of instruction.

According to Ely (2005), children master the rudimentary aspects of their native languages during the first years of life. By age three, they should have acquired a large and varied lexicon, whilst by age five their command of a language is relatively sophisticated. This sophistication should increase and progress as the child enters school and learns to read. D'Angiulli, Siegel, and Maggi (2004) cite a growing body of evidence showing that the development of reading skills in learners using English is similar to the development of reading skills in children with English as a first language. Gersten and Geva (2003) support the notion by stating that both English learners and English second language learners seem to take similar paths of development, specifically in pre-reading skills such as phonological awareness.

By Grade 4 in the South African educational system, many children are immersed in a second language curriculum in which they are faced with English as language of teaching and learning (LOLT), as opposed to mother tongue teaching and learning. According to Verhoeven (1990), second language learners face two types of difficulties, namely interlingual learning problems caused by mother tongue interference and intralingual learning problems, arising from the structure of the second language. Agreement exists however that, regardless of language use, word recognition remains a critical part of reading.

Children acquiring reading in a second language may experience difficulty with all three of these recognition processes (Verhoeven, 1990). This study will use scores of learners as obtained in their language of learning from Grades 1 to 3 (languages which, in South Africa, are not necessarily learners' mother tongues). Learning difficulties are expected to be more pronounced in cases where the word recognition processes are absent even for reading achievement in the mother tongue.

The work of Elley (2000) confirms the view that the challenge in raising literacy levels in developing countries specifically lies in the fact that so many learners receive schooling in a non-native or a second language. Elley (2000) provides evidence for the effectiveness of 'Book Flooding', by which it is possible to double the rate of reading acquisition of developing world primary schools. The strategy entails the introduction of 100 high interest books per class to primary schools, accompanied by short sessions of teacher training. Elley's (2000) findings in terms of benefits for reading skill and enthusiasm were consistent across diverse cultures, mother tongue and age of learners. Benefits were also recorded through improvement in children's writing, listening comprehension and related language skills, where these improvements are typically found to develop very slowly under traditional textbook styles of teaching.

Learner-level factors that are included for the purposes of this study (as taken from and measured by the PIRLS 2006 Learner Questionnaire) and methods for selecting these are discussed in Chapter 7.

3.3.2. Home Factors

The process of becoming literate begins long before a child enters a formal educational system. Purcell-Gates (1996) describes the construction of knowledge as a process that takes place within instances of situated dialogue, with children developing their explicit and implicit understanding of language systems through experience and in initial interaction with others within a specified cultural context. Therefore, literacy can be viewed as a cultural practice and young children begin to learn about reading and writing initially in

their homes. It is apparent that the home environment affects children's literacy and the difference between parents of good readers and those of poorer readers has been noted in the literature as associated with literacy levels achieved in a common age grade. Martin, Mullis and Gonzalez (2004) report that for every country participating in the Progress in International Reading Literacy Study (PIRLS) 2001, a strong relationship was found between fourth grade reading achievement and parents' reports of levels of engagement in literacy activities before their children started school.

According to Fiala and Sheridan (2003), parents of good readers tend to emphasize reading for meaning, while those of poorer readers tend to emphasize the reading of words rather than focusing on meaning and content. In terms of learners' home background, Fuchs and Woessmann (2004) state that family is consistently related to educational achievement, and measured in terms of parents' education and occupation and the number of books at home. Fuchs and Woessmann (2004) also refer to the Programme for International Student Assessment 2000 (PISA) study to support their claim that learners who live with both their parents seem to perform better than those who live with only a single mother. These learners perform better than those living with only a single father, who in turn perform better than those learners who do not live with their parents at all. Learners' achievement increases steadily with each higher category of their parents' education.

A related finding from Linnakyla et al. (2004), in their secondary analysis of Finnish and Swedish PISA 2000 data, is that learners ran a greater risk of low achievement if they came from a large family with many siblings. In addition, the risk increased when cultural communication at home was not active, meaning that parents seldom discussed political and social issues, books, films, television programmes or the news. Gonzalez-DeHass, Willems and Holbein (2005) refer to parental involvement that has a positive impact on their children's scholastic achievement. Their work acknowledges factors such as participation in parent-teacher interactions and school activities, engaging in their children's extracurricular activities and homework, reacting to their children's grades, assisting in selection of subjects, keeping abreast of

academic progress and imparting values of the importance of academic or scholastic success.

A finding also emanating from the PISA 2000 data, and of possible impact in this study, is that learners who have at least one parent working on a full-time basis performed at statistically better levels than those whose parents did not have full time employment. With regard to parental involvement, Linnakyla et al. (2004) confirm PISA 2000 findings that parents with less education tend to be less concerned with educational issues. PISA 2000 data also indicated that children from blue-collar families perform significantly below the lowest achievements of children from white-collar families.

According to Linnakyla et al. (2004), parents' economic status has a bearing on family resources beyond the school in support of their children's learning, in terms of books, computers, magazines, hobbies or the availability of private tuition. Hence, a family's access to social and economic capital seems to have the capacity to influence the children's learning positively.

In terms of these family resources, Fuchs and Woessmann (2004) point to a possible significant background factor when predicting reading literacy achievement, namely the number of books in the home. This aspect has also been consistently found to be of significance in the PIRLS 2006 study (Mullis et al., 2007). Although it seems that learners with more than 500 books in the home perform better than those without any books, the effect of this indicator seems to diminish greatly at the level of 250 books. Holding all other family background factors constant, it seems that the presence of computers at home leads to poorer achievement. The presence of computers in the home may indicate that they distract learners, since they can be used for many purposes other than learning, or reading for learning. The use of computers to assist learning and reading may not be the most efficient resource. Linnakyla et al. (2004) support this idea, but add that the presence of computers seems to have little to no effect when used infrequently or in moderation. The risk of diminished achievement is higher among the keenest users of computer technology.

Home factors, as measured at the learner-level, that are included for the purposes of this study (as taken from the PIRLS 2006 Parent Questionnaire) include aspects of literacy in the home, the availability of home resources, parent demographics and language in the home and are discussed in Chapter 7.

3.3.3. School Factors

Over the last ten years, South African teachers have faced extensive changes to the education system, and, the realization of many is that, whilst policy and curricula documents may be relatively easy to draft, the actual grassroots implementation can be far more difficult, if not impossible, to achieve. To add to the difficulty of implementation, in South Africa great variation exists between schools, and, after 15 years of democratic rule, schools that were previously designated for whites only are still very different from those that were assigned to the previously disadvantaged under the apartheid system. Johnson, Monk and Hodges (2000) are of the opinion that, in light of the starkness of continuing differences in teacher education and educational provision, South Africa effectively still has separate education systems operating within the country.

Despite these continuing differences in education provision, the national Department of Education views teachers as key contributors to transformation in South Africa, by envisioning teachers who are qualified, competent, dedicated and caring. Teachers' roles and functions include being mediators of learning, interpreters and designers of learning programmes and materials, leaders, managers, administrators, scholars, researchers, lifelong learners, community members and citizens, assessors and learning area or phase specialists ("RNCS, Grade R-9", 2002).

Prior to 1994, the system of teacher education in South Africa was driven by political logic to provide separate systems of education for different racial and ethnic groupings. This separation led to a fragmentation of teacher education institutions and an overall lack of coherence and quality assurance of programmes. For the first time, in 1995, a regulatory framework for teacher

education programmes began and culminated in the acceptance of the *Norms and Standards for Educators* in 2000. This policy framework provided procedures for the approval of teacher education programmes and outlined the kinds of qualifications that the Department of Education considered important in providing funding and employment opportunities (Robinson, 2003).

With regards to school-related factors impacting on the reading achievement of learners, Howie (2006) reports a number of factors specifically related to learners in South African classrooms. These factors include inadequate subject knowledge of teachers, inadequate communication ability between learners and teachers in the LOLT, lack of instructional materials, and difficulties for teachers to manage classroom activities effectively and overcrowded classrooms. Such findings are reflected in the work of Passos (2009), who carried out a comparative analysis of teacher competence and its effect on Grade 6 learner performance in upper primary schools in Mozambique and other SACMEQ countries. According to Passos (2009), the relationship between teacher competence and learner performance in reading and mathematics is influenced by cognitive, affective and behavioural factors.

Sailors, Hoffman and Matthee (2007), in their evaluation of schools that promote literacy learning in low-income communities, summarize the work of a number of researchers, such as Weber (1971) and Hoffman and Rutherford (1984), who identified common themes across effective schools that could guide reform efforts in the failing schools operating in resource-poor environments. The common themes in these schools that influenced learner achievement positively included:

- A clear school mission
- Effective instructional leadership and practices
- High expectations for learners to achieve and perform at their best
- A safe, orderly, positive physical environment
- Ongoing curriculum improvement
- Maximum use of available instructional time

- Frequent monitoring of learner progress
- Positive home-school connections

Following their work on high achieving schools from low-income environments in a sample of South African primary schools, Sailors et al. (2007) identified their own set of themes and factors that seemed to impact positively on learner achievement. In concordance with the work of other researchers, they cited the presence of a safe, orderly learning environment as having a positive influence on learner achievement. Another factor identified includes the presence of strong leadership that guides the school in terms of academic guidance, community relations and shared decision-making. In describing teachers as 'excellent', a third factor is identified that impacts learner achievement positively, namely being committed, competent, caring and collaborative. A fourth identified factor is that of a shared sense of competence, pride and purpose in schools that function effectively in low-income communities. Lastly, community participation and engagement with the school constitutes a factor associated with higher achievement among learners (Sailors et al., 2007).

Teachers often know more pedagogic strategies than they actually use, therefore a teacher's classroom practice might be considered to be only a selection from a wide range of content knowledge. Often classroom practice is constrained by the availability of resources and the normative behaviour of the environment in which the teacher works. New practices are only likely to survive if there is a fit with the teacher's working environment (Johnson et al., 2000).

Ediger (2004) is of the opinion that teachers need to be competent in the teaching of reading, since there is content for the learner to read in each learning area, regardless of the grade level that is taught. Behind Ediger's seemingly simplistic statement there is however a more complex picture of what the task of a competent teacher entails. In recent years, the teaching of reading has swung from a whole word methodology to phonics to direct instruction, and then to methods of whole language instruction as described by Stahl (1998). O'Sullivan (2003) adds to the list bottom-up reading instruction strategies (for example look-and-say) and top-down strategies (such as extensive reading, use

of context and pictorial clues). Despite these shifts in teaching reading, Gates (2002) is of the opinion that the success of teaching reading is not defined by how well the learner can perform in any of the component skills (such as sounding letters or word recognition), but rather by having acquired these skills as an entire enjoyable process with abundance of opportunity to read naturally and successfully. To this view, Brooks-Harper and Shelton (1998) add their support, by stating that the major objective for reading instruction is that learners will eventually be able to use reading competence to enhance their learning in a pleasurable way.

Allington and Johnston (2000) list in their review of effective fourth grade teachers and their classrooms a number of desirable classroom and teacher characteristics, amongst which are the following:

- Teachers who provide explicit instruction
- Teachers who have classroom routines
- Teachers who support and challenge their learners
- Classrooms where optimized reading opportunity is provided
- Classrooms where reading and writing is integrated with other subject areas
- Classrooms in which a focus is placed on meaning and the means to construct meaning
- Classrooms in which opportunities are provided to discuss what was read

The abovementioned characteristics paint a picture of effectiveness, but do not function in isolation from factors that could adversely affect reading achievement. Such factors include the teacher's education and experience, in-service activities, beliefs and instructional and assessment preferences. Some of the differences between effective classrooms with high achieving learners and ineffective classrooms with low achieving learners are highlighted by Richgels (2003) in the following way:

- Higher achieving classrooms have a better integration of reading skills instruction with holistic literacy activities.
- High instructional density occurs in high achieving classrooms, meaning that there is a great deal of instruction in all settings, serving multiple purposes.
- Effective teachers are able to scaffold what learners' learn by providing support for progress without doing the learning for the child.
- High achieving classrooms have self-regulated learners who enjoy independent work.
- Effective teachers are able to integrate reading and writing as simultaneous processes, while communicating high expectations of their learners.

Macdonald (2006) conceptualizes effective teaching and learning in a South African study by referring to 'mediation', a term initially used by Vygotsky, to describe the way in which the world is interpreted to children for them to make their own construction of it. Mediation takes place within the child's 'zone of proximal development', enabling him or her to be more successful in a problem-solving environment, if assisted by more capable significant others. According to Macdonald (2006), the context of literacy in South Africa, e.g. the way in which adults read to children, and the way in which books are understood, is not yet integrated well enough with Vygotsky's notions of mediation. There may well be a need for more understanding about how parents and teachers assist learners in making sense of the contexts in which they find themselves. This poor integration between children's context of literacy and how it is mediated to them is worsened by rapid socio-political change and turbulent curriculum innovation that have taken place over the last fifteen years. As yet, these changes have not been meshed significantly into the literacy contexts in which South African learners are embedded.

For the purposes of this study, school-level factors include items that have been selected from the PIRLS 2006 School Questionnaire and the PIRLS 2006

Teacher Questionnaire. These school-level factors and criteria for their inclusion in building multi-level models will be discussed in Chapter 7.

CHAPTER 4: THE PROGRESS IN INTERNATIONAL READING LITERACY STUDY (PIRLS) 2006

"The more that you read, the more things you will know. The more that you learn, the more places you'll go."

Dr. Seuss

PIRLS 2006 is an international comparative evaluation of reading literacy of Grade 4 (9 year-old) learners, involving more than 40 countries. The study was established to provide countries with information about learners' achievement in the core curriculum area of reading, to complement the mathematics and science data provided by the Trends in International Mathematics and Science study (TIMSS).

PIRLS 2006 is run under the auspices of the International Association for the Evaluation of Educational Achievement (the IEA). As an organization, the IEA undertakes international studies that benchmark performance of school-going children in mathematics, science, civic education, information, communication, technology and reading, inter ala. Currently, 46 countries are involved in the PIRLS 2006 collaborative analysis of children's reading literacy and the factors that influence reading acquisition.

4.1. PIRLS 2006 FRAMEWORK FOR LITERACY

PIRLS 2006 is the second, after PIRLS 2001, in a series of planned five-year cycles of assessment to measure trends in children's reading literacy achievement, policy and practices related to literacy. PIRLS 2006 aims to describe trends and international comparisons for:

- The reading achievement of Grade 4 learners
- Learners' competencies in relation to goals and standards for reading education
- The impact of the home environment and how parents foster reading literacy

- The organization, time and reading materials for learning to read in schools
- Curriculum and classroom approaches to reading instruction

Campbell, Kelly, Mullis, Martin and Sainsbury (2004) state that PIRLS focuses on three aspects of reading literacy. Firstly, *processes of comprehension* are ways in which readers construct meaning from text. They focus on and retrieve specific ideas, make inferences, interpret and integrate information, while also examining the text features. Secondly, *purposes for reading* are two types of reading that account for most of the reading young learners do, namely reading for literary experience and reading to acquire and use information. Subsequent sections of this document will pay particular attention to the types of reading comprehension and the purposes for reading found in the PIRLS 2006 assessment. Thirdly, *reading behaviours and attitudes* refer to those behaviours and attitudes that would promote lifelong reading habits.

Table 4.1 (below) provides a breakdown of the aspects of reading literacy as measured by PIRLS 2006. In the case of the South African study, these aspects were recorded or measured not only for Grade 4 but also for Grade 5 learners.

Table 4.1: PIRLS 2006 Aspects of Reading Literacy

Processes of Comprehension	1. Focus on and retrieve explicitly stated information 2. Make straightforward inference 3. Interpret and integrate ideas and information 4. Examine and evaluate content, language and textual elements
Purposes for Reading	Reading for Literary Experience Reading to Acquire and Use Information
Reading Behaviours and Attitudes	Contextual Questionnaires internationally administered to: - School principals - Grade 4 Teachers - Grade 4 Learners - Grade 4 Learners' Parents

In naming its 1991 study, the IEA decided to join the terms 'literacy' and 'reading' to convey the notion that literacy includes the ability to reflect on what is read and reading is a tool to achieve personal and societal goals. Thus,

according to Campbell et al. (2001), the framework for literacy that applies to PIRLS is as follows:

> ...the ability to understand and use those written language forms required by society and [or] valued by the individual. Young readers can construct meaning from a variety of texts. They read to learn, to participate in communities of readers and for enjoyment. (Campbell et al., 2001:3).

With this definition of reading literacy, the PIRLS 2006 framework regards reading literacy as a constructive and interactive process. According to Brinkley and Kelly (2003), the reader is now regarded as actively constructing meaning and as knowing effective reading strategies. Such readers have positive attitudes towards reading and read for the purposes of recreation and information acquisition. Meaning is constructed in the interaction between reader and text, in the context of a particular reading experience. Reading implies that the reader brings with him or her a repertoire of knowledge, skills, cognitive and metacognitive strategies.

The PIRLS 2006 framework for reading literacy acknowledges that reading is a constructive and interactive process involving interaction between the reader and the text. The context of reading is an important element in how readers create meaning and the choice of skills and strategies they use in order to do so. The framework also acknowledges that the structural elements of a text will influence a reader's strategies. In short, PIRLS 2006 conveys the notion that reading helps develop an understanding of text, thinking about text and reading various texts for many different purposes. It reasonably seeks to measure these elements.

4.2. ASPECTS OF READING LITERACY

PIRLS 2006 focuses on the three aspects of reading literacy, presented in Table 4.1. These aspects are outlined in this section.

4.2.1. Processes of Comprehension

The PIRLS 2006 assessment examines the processes of comprehension as well as purposes for reading. These two aspects do not function in isolation from each other, but rather work together to form the basis of the written test of reading comprehension. According to the PIRLS 2006 Assessment Framework and Specifications (Mullis, Kennedy, Martin & Sainsbury, 2004), readers construct meaning in different ways when faced with the task of reading. They are likely to:

- focus on and retrieve specific ideas
- make inferences
- interpret and integrate information and ideas
- evaluate and examine text features.

These four types of comprehension processes are used in the PIRLS 2006 assessment to develop the comprehension questions derived from reading passages that are finally presented to learners. A range of questions, each dealing with a particular process, enables learners to demonstrate their abilities and skills in constructing meaning from written text.

4.2.1.1. Focus On and Retrieve Explicitly Stated Information

When focusing on and retrieving explicitly stated information, learners use various strategies to locate and understand content that is relevant to the question posed in the test. Retrieving appropriate text from a reading passage not only means that the learners have to understand what is stated in the text, but to also ascertain how that content is related to the information sought (Mullis et al., 2004). Reading tasks that may exemplify this type of comprehension process include:

- Identifying information that is relevant to the specific goal of reading
- Looking for specific ideas
- Searching for definitions, words or phrases

- Identifying the setting of a story (e.g. in terms of time or place)
- Finding the main idea when explicitly stated.

4.2.1.2. Making Straightforward Inference

Constructing meaning from a text requires readers to make inferences about ideas or information not stated explicitly within it. Making these inferences allows the learner to move beyond what is stated in the text and to fill in the 'gaps' in meaning. Some of these inferences might be straightforward, implying that they are mostly indicated explicitly in the text. Although the ideas might be explicitly stated, the learner still needs to make the connections between ideas, thus the intended meaning of text must be inferred (Mullis et al., 2004).

Reading tasks that might exemplify this type of text processing include the following:

- Inferring that one event caused another event
- Concluding the main point by making a series of arguments
- Determining the referent of a pronoun
- Identifying generalizations made in the text
- Describing the relationship between two characters.

4.2.1.3. Interpret and Integrate Ideas and Information

When interpreting ideas and information, the learner is processing text beyond the phrase or sentence level. The learner might focus on local or global meaning, or may relate details to overall themes and ideas. This process is therefore an interpretive one, where learners attempt to construct a more specific or complete understanding of the text by integrating personal knowledge and experience with meaning found in the text (Mullis et al., 2004). Reading tasks that may exemplify this type of text processing include the following:

- Discerning the overall message or theme of a text
- Considering alternative actions by characters
- Comparing and contrasting text information
- Inferring a story's mood or tone
- Interpreting a real-world application of text information.

4.2.1.4. Examine and Evaluate Content, Language and Textual Elements

Examining and evaluating content, language and textual elements entail a shift in focus from constructing meaning to critically considering the text itself. According to Mullis et al. (2004), this focus allows for reflecting on textual elements, such as structure and language in order for the learner to examine how meaning is presented. During this process, the learner should draw on his or her knowledge of text genre and structure, an understanding of language conventions, and reflection on the author's devices to convey meaning, purpose, and perspective to the reader. In essence, examining and evaluating content, language and textual elements entail weighing of the learners' understanding of the text against their understanding of the world.

Reading tasks that may exemplify this type of text processing include the following:

- Evaluating the relative likelihood that the course of events described in the text could really happen
- Describing how the author devised a surprise ending
- Judging the completeness or clarity of information in the text
- Determining an author's perspective on the central topic.

4.2.2. PURPOSES FOR READING

The PIRLS 2006 assessment focuses on two purposes for reading, namely:

- Reading for literary experience
- Reading to acquire and use information

These two purposes for reading account for most of the reading done by young learners in and out of school. Although the PIRLS 2006 assessment distinguishes between these two purposes for reading, the underlying processes and strategies readers use for both purposes are very similar.

Each of these purposes for reading is often associated with specific types of texts. For example, reading for literary experience is often associated with fictional material, while reading to acquire and use information is more likely to be associated with informative articles and instructional texts. The PIRLS 2006 assessment takes the form of fictional passages when reading for the purposes of literary experience, and articles for the purposes of reading to acquire and use information. However, these purposes for reading do not align strictly with these types of texts. Because tastes and preferences vary so widely, almost any text could conceivably meet either purpose for all learners (Mullis et al., 2004).

4.2.2.1. Reading for Literary Experience

In literary reading, the reader engages with the text to become involved in imagined events, settings, actions, consequences, characters, atmosphere, feelings and ideas. The main form of literary texts when reading for literary experience in PIRLS 2006 assessments is narrative fiction.

4.2.2.2. Reading to Acquire and Use Information

When reading to acquire and use information, the learner does not engage in imagined worlds, but with aspects of the real world. By means of informational

texts, the learner can understand how the world is and has been, and why things work the way they do. The corresponding PIRLS 2006 passages are aimed not only at the acquisition of knowledge and information, but also at assessing the learner's ability to use reasoning (Mullis et al., 2004). For the purposes of reading to acquire and use information, text formats in the PIRLS 2006 assessment take the form of factual articles.

4.2.3. READING BEHAVIOURS AND ATTITUDES

Reading behaviours and attitudes are those elements that would promote lifelong reading habits. The PIRLS 2006 assessment makes use of contextual questionnaires that are administered internationally to Grade 4 learners, to Grade 4 teachers, to school principals and to Grade 4 learners' parents, in order to gauge reading attitudes and behaviours. For the South African study, these instruments were also administered to Grade 5 learners, their parents and Grade 5 teachers. Principals were requested to complete a school questionnaire as it pertained both to Grade 4 and Grade 5 learners.

According to Mullis (2002), the aim of gathering background information on learners, their parents, teachers and school principals, is to describe the learners being assessed accurately, in order to understand the factors at play that may be influencing their educational experiences. Mullis (2002) notes that background information is also important to evaluate the potential for bias resulting from learners' non-participation. Background information should answer questions about learners who were absent on the day of assessment. It could also be used to gauge whether or not learners who refused participation in the assessment appear to differ greatly from those who did participate, so as to determine if the recorded levels of achievement might have been artificially increased or decreased. Together with descriptions of learners and their backgrounds, contextual information about educational settings and experiences can reveal striking differences in how resources are distributed and utilized between different groups or provinces of learners (Mullis, 2002).

Another important reason for collecting background information is to inform educational policies in relation to the opportunities learners are afforded to learn. Policy is informed by what emanates from the content that is officially specified in the curriculum, whether and how it was taught, learners' predisposition to learn, as well as a range of home and school factors that can support and enhance the learning process.

Mullis (2002) broadly lists the educational areas addressed by the PIRLS 2006 contextual questionnaires as curriculum, learner characteristics and experiences, home/school connection, school environment, teacher characteristics, classroom resources and instructional practices.

More specifically, Table 4.2 (below) illustrates how the questionnaire frameworks relate reading achievement to factors associated with national and community, home and school contexts:

Table 4.2: Factors within the Home, School, National and Community Contexts addressed by PIRLS 2006

Context:	**Factors addressed by contextual questionnaires**
National and Community Contexts	• Emphasis on literacy • Demographics and resources • Governance and organization of educational system • Curriculum characteristics and policies
School Contexts	• School policy and curriculum • School environment and resources • Teacher training and preparation • Classroom environment and structure • Instructional strategies and activities • Instructional materials and technology • Homework and assessment
Home Contexts	• Activities fostering reading literacy • Languages in the home • Economic resources • Social and cultural resources • Home/school connection • Learners' out-of-school literacy activities

4.3. PIRLS 2006 ASSESSMENT INSTRUMENTS

This section pays particular attention to the PIRLS 2006 assessment instruments. These instruments included reading achievement booklets from which learner performance was derived. Contextual questionnaires accompanied the reading achievement booklets and were administered to Grade 5 learners, their parents, Grade 5 teachers and school principals.

4.3.1. Achievement Booklets

In the PIRLS 2006 reading assessment, the two purposes for reading (for literary experience and to acquire and use information) are each represented by a number of reading passages, with accompanying questions learners are required to answer.

The PIRLS 2006 structure makes use of a matrix design technique, whereby the passages and accompanying questions are divided into groups or blocks (Mullis, Kennedy, Martin & Sainsbury, 2004). Individual learner booklets are made up of sets of two of these ten blocks (see Table 4.3, below) according to a specific plan, where testing time is separated into two 40-minute blocks of passages and questions.

The blocks are labeled L1-L5 for the literary passages and I1-I5 for the informational passages (see Table 4.4, below). Four of the ten blocks were retained from the previous cycle of PIRLS 2001 as a foundation for measuring trends over the 5-year interval in reading achievement for previously participating countries.

Table 4.3: PIRLS 2006 Matrix Sampling Blocks

Purpose for Reading	**Block**				
Literary Experience (Literary texts)	L1	L2	L3	L4	L5
Acquire and Use Information (Informational texts)	I1	I2	I3	I4	I5

Table 4.4: PIRLS 2006 Test Booklet Design

Booklet Number	Reading Passage	Reading Passage
1	L 1 (Passage from PIRLS 2001)	L 2 (Passage from PIRLS 2001)
2	L 2	L 3
3	L 3	L 4
4	L 4	I 1 (Passage from PIRLS 2001)
5	I 1	I 2 (Passage from PIRLS 2001)
6	I 2	I 3
7	I 3	I 4
8	I 4	L 1
9	L 1	I 1
10	I 2	L 2
11	L 3	I 3
12	I 4	L 4
Reader (13)	L 5	I 5

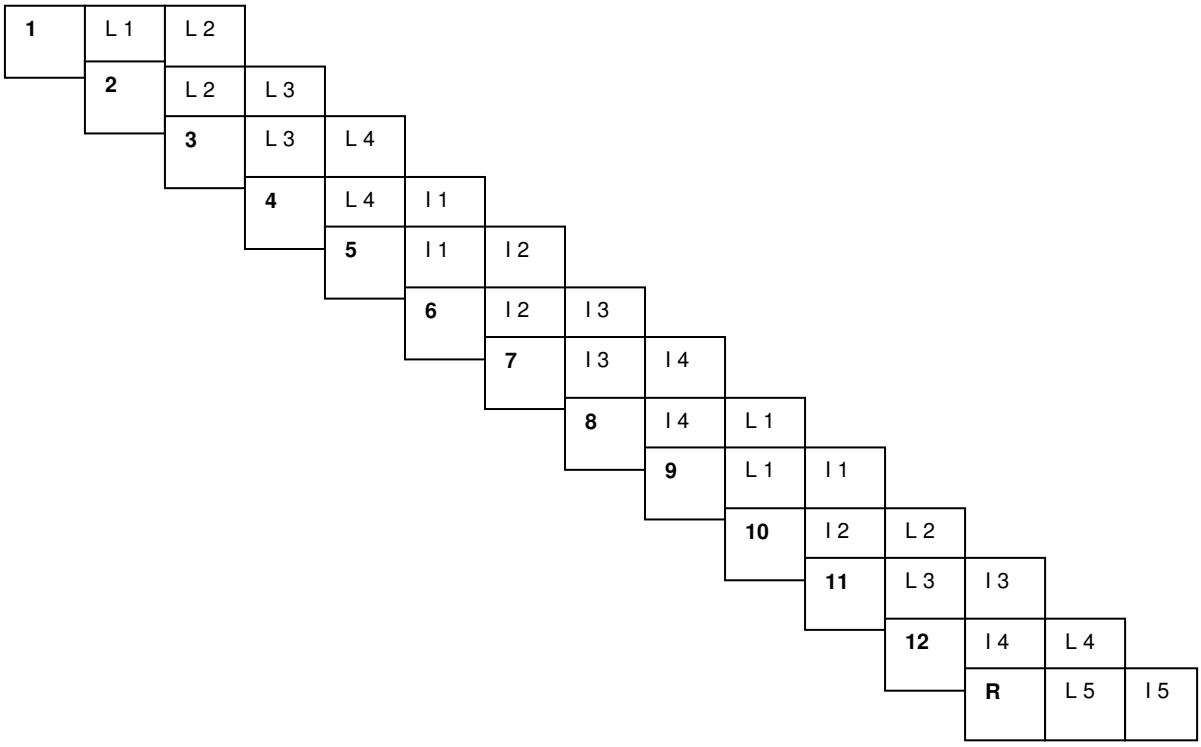


Figure 4.1: Matrix Design per Test Booklet

In the PIRLS 2006 design, the ten blocks are distributed across 13 possible booklets. During data collection, each learner responded to one such test booklet consisting of two reading passages. In order to present some passages in a more visually appealing manner, two blocks (one literary and one informational) were presented in a colour-printed, magazine-type format, with the questions in a separate booklet. This booklet (booklet 13) is referred to as the PIRLS "Reader". Figure 4.1 (above) illustrates the matrix design for each

test booklet. Up to and including booklet 9, each second reading passage becomes the first reading passage in the following booklet.

Two question formats are used in the PIRLS 2006 assessment, i.e. multiple choice and constructed response questions. The former provided learners with four response options, of which only one was correct. Each multiple-choice question was worth one point, while correct answers to constructed response questions were worth one, two or three points, depending on the depth of understanding required.

According to Mullis et al. (2004), multiple-choice questions are used to assess any of the comprehension processes. However, as these types of questions do not allow learners to explain or support statements, they were deemed less suitable to assess learner abilities to make more complex interpretations or evaluations. To remedy this unsuitability, the PIRLS 2006 comprehension texts also made use of constructed response questions that are considered to be consistent with the definition of literacy underlying the framework. Constructed response questions reflect the interactive, constructive view of reading, where meaning is constructed between the reader, the text and the context of the reading task. To tap the constructed elements, these types of questions require learners to provide support for what was inferred from reading or to make interpretations depending upon background knowledge and experience (Mullis et al., 2004).

4.3.2. Contextual Questionnaires

In addition to test booklets aimed at providing a basis of measurement for learners' reading performance, the assessment was accompanied by contextual questionnaires to be completed by learners, parents, educators and school principals. In this way, additional information was gathered on home and school factors associated with individual learners' reading performance by Grade 4. According to Kelly (2001), the contextual questionnaires are grounded in a model that relates reading outcomes, as exhibited by learners' reading achievements and attitudes, to home, school and national contexts.

4.3.3. Learner Questionnaire

Each learner participating in the PIRLS 2006 assessment was requested to complete a learner questionnaire, which sought to elicit information about learners' home and school experiences and included aspects such as instructional experiences, reading for homework, self-perceptions and attitudes towards reading, out-of-school reading habits, computer use, home literacy resources and basic demographic information.

4.3.4. Learning to Read Survey (Parent Questionnaire)

Referred to by PIRLS 2006 as the 'Learning to Read Survey', this questionnaire was addressed to parents or primary caregivers of learners. It dealt mainly with parent-child literacy activities, availability of literacy resources in the home, parents' reading habits and attitudes, connections between the home and the school, and basic demographic information and socio-economic indicators.

4.3.5. Teacher Questionnaire

For each of the sampled classrooms, reading teachers of learners were requested to complete a teacher questionnaire. Mainly intended to gather information about classroom contexts for developing reading literacy, this questionnaire also focused on general classroom characteristics (for example class size, language abilities and reading levels of learners). The questionnaire also explored factors related to teachers' reading instruction, which included aspects of instructional time, available materials, grouping learners in different or same ability groups, and activities undertaken in the classroom to promote and develop learners' reading literacy. The questionnaire enquired about teachers' use of resources, their assessment practices and efforts to maintain a connection between the learners' homes and the school. This comprehensive questionnaire concluded with questions regarding the teachers' opportunities for professional collaboration and professional development, and their current education and training.

4.3.6. School Questionnaire

For each of the sampled schools in PIRLS 2006, principals were expected to complete a school questionnaire, exploring enrollment, school demographics, availability of resources and socio-economic indicators related to the learner population for the associated school. The questionnaire focused upon national and community level in terms of reading curriculum policies and total instructional time for the school year. The school questionnaire also elicited responses to questions pertaining to the availability of materials and staff, perceptions about school climate, as well as the interaction and cooperation between the school and the learners, their parents or other caregivers.

4.4. RESEARCH DESIGN AND METHODOLOGY: PIRLS 2006

Gay and Airasian (2003) define 'research' as the scientific and disciplined inquiry approach to the study of problems, applied in a formal, systematic way. It is therefore a process of inquiry and formulating specific questions, the answers to which lead to a better understanding of the problem at hand (Graziano & Raulin, 2000), normally with a view to informing choices of constructed response or information.

For the purposes of the PIRLS 2006 study, quantitative research methodology was used in the form of survey research. According to Gay and Airasian (2003), underlying quantitative research is a belief that the object of study is relatively stable, uniform and coherent. Thus, it is assumed that a phenomenon (in this case, related to the topic of reading literacy) can be measured, understood and generalized upon. Quantitative methods are based on the collection and analysis of numerical data usually obtained from questionnaires, tests, checklists and other paper-and-pencil instruments. In the case of survey research, quantitative information is produced which may assist the researcher to explore and explain particular phenomena. Generally involving large samples of respondents, surveys aim to measure a number of variables, test multiple hypotheses and possibly infer temporal order from questions concerning past behaviour, experience, preference, beliefs and opinions (Neuman, 1997).

At this point it is necessary to make a distinction between this study and the PIRLS 2006 study. This study utilized South African data from the IEA's Progress in International Reading Literacy Study 2006, and was therefore a secondary analysis of questionnaire data and learner reading achievement as measured by a number of reading tasks. The aim of this secondary analysis was to illuminate underlying patterns in data emanating from the South African PIRLS 2006 study based on patterns of contrast in performance from the different language groups. Data analysis will be aimed at describing the current conditions related to learners' reading environment in relation to the learners' language background. It was expected that different relationships may exist between the response variable and the possible explanatory variables impacting on reading achievement, across different language groups.

4.5. SAMPLING DESIGN FOR PIRLS 2006

One of the major components in undertaking an international comparative study such as PIRLS 2006 is the proper selection of samples. By properly selecting samples, it is likely that unbiased, accurate and internationally comparable survey estimates will be obtained.

PIRLS 2006 takes the form of a cross-sectional survey with the aim of investigating reading literacy at one particular time, within a single learner population for each of the participating countries. According to Gay and Airasian (2003), such a cross-sectional survey design allows for data collection at one particular time, in order to provide information on the current status of a phenomenon, in this case reading literacy.

The sample design proposed for PIRLS 2006 is generally referred to as a three-stage stratified cluster sample. Foy and Joncas (2003) name three reasons for stratifying:

- To produce reliable estimates, using different sampling designs, for sub-national domains, e.g. provinces or states.
- To improve the sampling efficiency, thus improving the reliability of national estimates without necessarily increasing sample sizes.
- To ensure that different parts of the population are appropriately represented in the sample.

Examples of stratification variables included regions (e.g. provinces), urbanization (e.g. urban vs. rural), socio-economic status (e.g. low, medium or high), school types (e.g. public vs. private) and school programmes (e.g. elementary, primary or secondary).

4.5.1. First-Stage Sampling Units

The first stage of sampling consisted of individual schools that were selected with probabilities proportional to their size. In this case, school size was measured by the estimated number of learners enrolled in the target grade. Foy and Joncas (2003) refer to a school sampling frame as a comprehensive national list of eligible schools. Prior to sampling, schools in this sampling frame were assigned to a predetermined number of strata, thereby making the stratification implicit, explicit or both. Foy and Joncas (2003) explain 'explicit stratification' as building separate school lists (or sampling frames) according to a set of explicit stratification variables under consideration. 'Implicit stratification', on the other hand, involves the sorting of already existing sampling frames by a set of implicit stratification variables, thus ensuring a strictly proportional sample allocation of schools within and across all implicit strata.

As the schools were sampled, replacement schools were simultaneously identified should the need have arisen to replace non-participating sampled schools. Non-participating sampled schools in South Africa constituted those schools that were not functional, for example due to fire or floods, or schools that no longer existed, for example where mergers between two neighbouring

schools had taken place, but where such mergers had not yet been updated on the national list of schools.

4.5.2. Second-Stage Sampling Units

This second stage of sampling refers to classrooms within sampled schools. Within each sampled school, a list of eligible classrooms for the target grade was prepared. From this list, a single eligible classroom was randomly selected. In this regard, Foy and Joncas (2003) encouraged each participating country to sample two classrooms per school.

4.5.3. Third-Stage Sampling Units

The third-stage sampling units refer to learners within sampled classrooms. The PIRLS 2006 study population desired for subsequent valid inferences is defined as all learners enrolled in the upper of the two adjacent grades that include the largest proportion of 9 year-old learners at the time of testing (Foy & Joncas, 2003). For most participating countries, the upper grade should be Grade 4, otherwise it would refer to the national equivalent.

Generally, all learners in a sampled classroom were selected for the PIRLS 2006 assessment. Foy and Joncas (2003) point out the possibility of sub-sampling within sampled classrooms, but warn that this device may complicate survey operations, and so reduce the sample precision, despite consequent savings on printing, scoring and data entry. For the South African sample, no sub-sampling was attempted, which meant that intact Grade 4 and Grade 5 classes were selected and not sub-samples of learners in selected classes.

Each national sample of schools selected is intended to be a representative sample of all eligible schools in a specific country. For this study, teachers linked to the selected learners from sampled classrooms were asked to respond to teacher questionnaires. Unlike schools of a particular country, the teachers who responded to the teacher questionnaire were not regarded as a suitable representative sample of teachers within the country. Rather, these teachers

were regarded as reading teachers who teach a representative sample of learners within a country (Foy & Joncas, 2003).

4.5.4. Participation Rates and Exclusions

Participation requirements were set out by design at 85% of initially sampled schools. Non-participating schools were substituted by matched 'replacement schools' in order to meet sample size requirements. Although a system of replacement schools was available, participating countries were discouraged from utilizing replacement schools too often and were still required to have the participation of at least 50% of the initial (or preferred) sample of schools.

In terms of classroom participation, a high rate of 95% of sampled classrooms was required. The substitution of classrooms was not permitted. In terms of learners and teachers, an 85% participation rate was required. Learner participation was calculated at 85% of the selected learners at the national level, not necessarily for each participating school. As with classroom substitution, teacher substitution was not allowed, since PIRLS 2006 required teachers of participating Grade 4 classrooms to complete questionnaires relating teaching practices and classroom variables to learner achievement at classroom-level.

Despite these stringent requirements, the PIRLS 2006 study made provision for exclusions. According to Foy and Joncas (2003), reasons for exclusion were usually of a practical nature, for example increased survey costs increased complexity in the sample design or difficult test conditions. Exclusions could occur at school-level, where entire schools were excluded, or within schools, where specific learners or specific classrooms were excluded from participation.

School-level exclusions were acceptable in cases where schools were:

- Geographically inaccessible
- Extremely small in size

- Offering a curriculum or school structure radically different from the mainstream educational system

Within-school exclusion criteria allowed for the exclusion of the following learners:

- Intellectually disabled learners who are unable to follow general instructions of the test. This criterion does not include learners with poor academic performance, but only those who have been professionally and psychologically evaluated as intellectually disabled.
- Functionally disabled learners who would not be able to respond physically to a testing situation.
- Non-native language speakers, including those learners who are unable to overcome the language barrier of the test.

Exclusions had to be kept to a minimum, and specifically not more than 5% of the national desired target population, both at school-level and within-school samples.

The PIRLS 2006 sample size requirements demanded the participation of a minimum of 150 schools and 4 000 tested learners per country. In South Africa, an intended, national sample of 441 schools was drawn up. The selected sample of schools was stratified geographically and linguistically and covered schools from nine provinces, within which all 11 official languages were represented as languages of instruction. A total of 16 073 Grade 4 learners participated in PIRLS 2006 in South Africa from a realized sample of 429 (98.5%) schools. For Grade 5, the corresponding figure was 397 schools (96.5%). Intact Grade 4 classes from each school were selected for participation and all learners present on the day of testing were included in the sample. In terms of Grade 5 learner participation, the sample resulted in 14 657 learners being assessed from intact classrooms from the same schools that were selected for the Grade 4 sample.

4.6. TRANSLATION OF PIRLS 2006 ASSESSMENT INSTRUMENTS

The PIRLS 2006 assessment instruments were developed and prepared in English by the International Study Centre (ISC) at Boston College. National Research Coordinators (NRCs) of participating countries also made contributions. Participating countries subsequently translated the assessment instruments into their local languages of instruction – in South Africa's case, translation of assessment instruments was effected for all 11 official languages.

According to Kelly and Malak (2001), a good translation follows the conventions of the target language and the cultural context, while at the same time conveying the same meaning as the source text. This definition means that:

- Translated text should have the same language level and degree of formality as the source text.
- Translated text should have correct grammar, use of tenses and placement of verbs and prepositions.
- Translated text should not clarify, omit or add information not given in the source text.
- Translated text should have equivalent qualifiers and modifiers in an order appropriate for the target language.
- Idiomatic expressions should be translated appropriately and not necessarily word-for-word.
- Aspects of spelling, punctuation and use of capitals should be appropriate for the target language, the country and cultural context.

In designing the translation process, the ISC had to ensure the standardization and uniformity of instruments across countries. This objective meant that each participating country had to follow specific procedures, set out in guidelines provided to all NRCs in the PIRLS 2006 Survey Operations Manual. These guidelines and procedures were discussed and further elaborated upon at relevant NRC meetings. The importance of such a translation process was to ensure that valid comparisons could be made. It is important to ensure equivalence in passages and items across languages, while at the same time

acknowledging that differences in expression across countries had to be incorporated in the translations where necessary.

4.6.1. The Translation of Instruments in South Africa

PIRLS 2006 translation guidelines required translation of each instrument from English to the target language. The translation procedure required the following:

1. Identification of the target language (or language of instruction).
2. Identification of translators for an independent translation. Translators were required to have knowledge of English as well as the target language.
3. Translation of instruments from English to the target language and adaptation in cases deemed necessary.
4. Back-translation of instruments from the target language into English.
5. Comparison and reconciliation of the two independent translations.
6. Documentation of all cultural adaptations.

4.6.1.1. Identification of the Target Language

For the South African context, the assessment instruments had to be translated into all 11 official languages. This requirement meant that each of the test booklets comprising the reading passages with items was translated for each of the official languages. In terms of the contextual questionnaires, only the parent and learner questionnaires were translated into the other 10 official languages. This restriction was adopted not only to keep the costs of translation as low as possible, but also in anticipation that most teachers and school principals (who were requested to complete the teacher and school questionnaires) were in all likelihood able to speak, write and understand English. Thus, for these groups, background questionnaires were administered in English only.

4.6.1.2. Identification of Translators for Independent Translation

Only professional translators, many of whom are registered with the South African Translators Institute, were appointed, to ensure accurate translations of high standard for all the languages. Translators were allowed to change terms and expressions that were not familiar in their culture, given that the change would not affect the substance of the text or question, alter the meaning of the question or affect the reading level of the text.

Participating countries in PIRLS 2006 were advised to appoint translators with the following abilities or characteristics:

- Knowledge of English
- Knowledge of the target language
- Experience in the country and its cultural context
- Experience with learners in the target population to be tested with the PIRLS 2006 assessment instruments
- Familiarity with test development

In translating the PIRLS 2006 instruments, translators had the following responsibilities:

- Identifying and minimizing cultural differences in reading texts and background questionnaires
- Finding words and phrases equivalent to those used in English
- Ensuring that the reading level of texts remained the same in the target language as in the original English version
- Ensuring that the meaning of the texts and questions did not change.

4.6.1.3. Translation and Adaptation

The PIRLS 2006 assessment instruments and contextual questionnaires underwent a first round of translations for the purposes of conducting the field

test in March 2005. The translation task was staggered, which meant that the translation of instruments was not done at once for all 11 official languages. Initially, instruments were only translated into Afrikaans, isiZulu and isiXhosa, chosen not only because they represent the larger language groups within the country, but also because of the fact that Afrikaans and isiZulu schools had been included in the field test held during March 2005.

Translators were allowed to make adaptations to the text in order to make unfamiliar contextual terms culturally acceptable. Acceptable changes included the following:

Table 4.5: Examples of Culturally Acceptable Adaptations

Type of Change:	Change from:	Change to:
Units	inches miles	centimeters kilometers
Common Nouns	candy	sweets
Spelling	recognize centre	recognise center

4.6.1.4. Back Translation from Target Language into English

Following the first round of translations from English to Afrikaans, isiZulu and isiXhosa respectively, all the assessment instruments and questionnaires were translated back and compared with the English instruments. The back-translation stage involved different translators from those responsible for the first round of translations. Thus, the back translated versions could be compared to the original English versions of the instruments. Any inconsistencies or differences in meaning between the original and back translated versions of the instruments were checked. Where differences in meaning were found, instruments were subsequently sent back to the original translators to make adjustments or changes to their translated Afrikaans, isiZulu or isiXhosa versions, and in order to ensure that the same meaning was reflected in the English instruments as in the final versions of any other translated language.

Field test results were made available in August 2005, on the basis of which, final adaptations were made to reading passages and background

questionnaires. These adaptations entailed, in some cases, slight changes in wording to passages or adding questions to background questionnaires. In addition to general adaptations, unsuitable reading passages were also eliminated from inclusion in the PIRLS 2006 main study. Decisions to exclude unsuitable passages were based on item statistics as well as participating countries' favourable or unfavourable opinions of passages.

Once these decisions of exclusion and general adaptations were made, South Africa proceeded with the translation task. Achievement booklets and learner and parent questionnaires were updated in Afrikaans, English, isiZulu and isiXhosa to reflect the new changes. In addition, achievement booklets, and learner and parent questionnaires were translated into the remaining seven languages, namely Sepedi, Sesotho, Setswana, SiSwati, Tshivenda, Xitsonga and isiNdebele. The translation process for the remaining seven languages followed the same process as was used for the initial four languages, that is, a first round of translations followed by back translations from the target languages into English. This round was followed by a process of reviewing and reconciling any significant differences in meaning between the original English and back translated versions.

4.6.1.5. Documentation of Cultural Adaptations

National Adaptation Forms were used to record any and all adaptations made to the achievement booklets or background questionnaire items for PIRLS 2006. The description of each adaptation included the original English term, followed by the translated terms for test or questionnaire items. This documentation was submitted to the IEA secretariat for each language of translation and was used during the translation verification process to evaluate the quality of the translations.

4.6.1.6. International Verification of Instrument Translations

Upon completion of the translation process of assessment instruments and contextual questionnaires for all 11 official languages, instruments were

scrutinized through a process of international translation verification. In order to adhere to strict quality control measures, all translated assessment instruments and questionnaires were submitted to the secretariat at the International Association for the Evaluation of Educational Achievement (the IEA). To ensure standardization of instruments across countries, the secretariat appointed independent translation verifiers to assure quality and verify translated instruments for each country participating in PIRLS 2006.

The primary task of translation verifiers was to evaluate the accuracy of the translation of the survey instruments. This task involved making recommendations for improvements in the translations where necessary, as well as notifying the national research coordinators of any deviations from the international version in the layout of the translated instruments. Their task thus involved the evaluation of accuracy of translations and justification for and adequacy of any cultural adaptations. More specifically, verifiers had to ensure the following criteria were satisfied by the translated material submitted for verification:

- The difficulty or meaning of the text was not affected by the translation
- Questions did not become more difficult or easy as a result of translation
- Information was not added or omitted
- All assessment booklets comprised the correct passages and all the items
- All background questionnaires included all the original items

Instruments were verified twice, once before the field test and once before the main data collection. The verification process required verifiers to review the translated instruments and record any deviations in 'Translation Verification Records'. Separate forms were used for the assessment booklet directions, the achievement booklets and each of the four background questionnaires. For the purposes of these verification records, severity codes were used, ranging from 1 (indicating major changes or errors) to 4 (indicating acceptable changes).

Major changes or errors related to translations included:

- Incorrect order of choices in a multiple-choice question
- Omission of questions
- Incorrect translations resulting in the question revealing the answer
- Incorrect translation that changed the meaning or difficulty of a passage or question

Minor changes or errors included spelling errors that did not affect comprehension. Minor changes were deemed acceptable and appropriate, for example where units of measurement were changed to those units used by the corresponding country. Where suggestions for alternatives indicated that the translation might have been inadequate, the translation verifier suggested different wording.

Completed verification records were sent to NRCs and the International Study Centre at Boston College. NRCs were not required to accept all recommendations made by the verifiers, but rather they would document changes that did not seem warranted or appropriate, along with reasons for not changing the text.

The review of verification reports by NRCs meant that assessment instruments could once again be submitted to the International Study Centre for final review. Once all mistakes or deviations had been corrected, the Centre provided final approval for the printing and administration of assessment instruments and background questionnaires. South Africa met all the international requirements of the verification process in all 11 official languages.

4.7. DATA COLLECTION, MONITORING AND SCORING

The South African study of PIRLS 2006 took place on a large scale and great care was taken in preparing, printing and packing instruments for distribution to each of the participating schools located in all 9 provinces and representing all

11 official languages. Due to the scale of the study, a market research company was appointed to conduct data collection. Fieldworkers were trained according to the standardized procedures for data collection as set out by the IEA. Training manuals set up by the IEA explained procedures for receipt and distribution of materials, and activities related to the test session. These details included aspects such as ensuring test security, the use of standardized scripts to regulate test directions and timing, rules for answering learners' questions, and steps to ensure that identification on the test booklets and questionnaires corresponded to information on the forms used to track learners (Mullis, Martin, Gonzalez & Kennedy, 2003).

In South Africa, data collection for PIRLS 2006 took place from October 2005 and was completed by the end of January 2006. Consistency in data collection within and between countries had to be ensured and compliance with IEA standards and guidelines was of utmost importance. For these reasons a monitoring process was put into place and each country appointed an International Quality Control Manager to act as an external, objective observer of the data collection. Each National Research Centre was also tasked with appointing National Quality Control Officials to act as observers of data collection. Table 4.6 (below) provides an indication of the number of participating schools that were monitored in each province in South Africa.

Table 4.6: Number of Schools Monitored for PIRLS 2006

Province	Number of schools monitored
Eastern Cape	2
Free State	4
Gauteng	3
KwaZulu-Natal	4
Limpopo	2
Mpumalanga	6
Northern Cape	4
North West	8
Western Cape	1

Upon completion of data collection, assessment booklets were unpacked and scored, and to complete the scoring for each of the 11 official languages used, the help of undergraduate students from the Faculty of Education at the University of Pretoria was enlisted. Where possible, first language speaking students for each of the 11 official languages were assigned the task of scoring.

A large part of the PIRLS 2006 assessment consisted of constructed-response items, and as had been the case with the data collection process, consistency and reliability in evaluating learner responses within and across countries had to be ensured. The International Study Centre prepared detailed scoring guides with rubrics and explanations for the allocations of marks for each constructed response item, from each of the reading passages. These rubrics and guidelines were also accompanied by extensive examples of learner responses to each of the items. The scoring guides, along with training packets supplying examples of learner responses on which scorers were to practice applying the rubrics, were used as a basis for intensive scoring training. Training sessions were initially held with representatives from research centres, which in turn had to be responsible for ensuring training personnel in their own countries applied the scoring rubrics reliably.

Information was gathered about the within-country agreement among scorers by having systematic sub-samples of at least 200 learner responses to each item scored independently by two different scorers. The correspondence between assigned scores from the two different scorers would constitute the reliability of scoring. Information was also gathered on the reliability and consistency of scoring between countries. In this regard a number of learners' responses were collected from those countries that administered PIRLS 2006 in English. This set of responses was sent to each country that had scorers proficient in English, to be scored independently by two of these scorers. According to Mullis et al. (2003), agreement in assigned scores across countries was defined in terms of the percentage of these comparisons that were in exact agreement with one another.

4.8. DATA PROCESSING

PIRLS 2006 utilized rigorous quality control steps to ensure that comparable, high quality data was available for analysis. The IEA made software available (*WinDEM*) with which to capture and verify data. All data recoding and national adaptations of international variables were recorded in the National Adaptation forms and submitted to the Data Processing Centre (DPC). The DPC was subsequently responsible for more consistency checks for the release of data in September 2007 (Venter & van Staden, 2007).

The general approach to reporting achievement in the PIRLS 2006 assessment is by means of Item Response Theory (IRT) scaling methods. Learner achievement is summarized by using 2- and 3-parameter IRT models for dichotomously scored items (i.e. items that are either right or wrong), and generalized partial credit models for items worth two or three points. The IRT scaling method takes into account the difficulty value and discrimination power of each item, thus producing an average score for each learner based upon the items to which he or she responded. IRT scaling methods employed in PIRLS 2006 allow for calculating reliable scores for learners, even though each learner only responded to two of the possible ten reading passages.

Another aspect of the IRT scaling method is that it allows for score estimates of learner sub-populations, meaning that plausible values are computed for learner achievement as five separate estimates of each learner's score are generated on two scales: that of learner responses to the items in the achievement booklets and one based on the learner's characteristics. The five score estimates represent what is known as 'plausible values' and the variability between these scores encompasses all possible outcomes of achievement in the score estimation process (Mullis et al., 2003).

Mullis et al. (2003) state that IRT methods were preferred for developing estimates of performance, since learners responded to different items depending upon which of the test booklets they had received. In addition, IRT analysis places performance on a common scale by which comparisons can be

made across countries. In treating all participating countries equally, the PIRLS 2006 scale average across countries was set to 500, with a standard deviation of 100. Although countries differ in size, they were weighted in order to contribute equally to the mean and standard deviation of the scale.

The results of PIRLS 2006 were made available at an international press conference on 28 November 2007 at Boston College in the USA. The South African results were released at a press conference on 29 November 2007, directly following the international release of results.

CHAPTER 5: CONCEPTUAL FRAMEWORK, RESEARCH DESIGN AND METHODS

"Every man who knows how to read has it in his power to magnify himself, to multiply the ways in which he exists, to make his life full, significant and interesting."

Aldous Huxley

This study mainly proposes to identify, illuminate and explain relationships between some major factors associated with successful reading at Grade 5 level in South African primary schools.

As a secondary analysis of PIRLS 2006 South African data, this study's use of Creemers' Comprehensive Model of Educational Effectiveness as conceptual framework with methods of multi-level analyses will attempt to investigate South African learners' reading performance when given reading tasks in the language of learning and teaching (LOLT). The conceptual framework and design for this study acknowledge an underlying supposition taken by the researcher, which is that the causal elements and reasons for struggling to read are not the same for all learners. On that basis, a uniform curriculum is necessary, but discretion is needed in how it is implemented, since it should serve as a guide. A singular or a one-dimensional explanation for learners' poor reading performance is equally inappropriate and inadequate in addressing a vastly varying and diverse learner population in South Africa.

In understanding the reasons for poor reading performance, and identifying those factors that can be associated with successful readers and with readers at risk of failure, three systems seem to be of major influence in reading performance, namely the home, the school and the learners themselves. Factors pertaining to Grade 5 learners, through their home environment, the classroom and the school, which could impact on reading performance, will be identified in this study and used to map learner profiles within each of the language groups in South Africa.

The remainder of this chapter will provide a detailed outline of the conceptual framework and the adaptation of Creemers' Comprehensive Model of Educational Effectiveness to that of a model of reading effectiveness for the purposes of guiding the data analysis process for this study (section 5.1 and 5.2). Discussions of the conceptual framework are followed by the research questions to be addressed, a discussion of the research design and methods that will be employed in addressing the research questions (section 5.3 and 5.4). The chapter concludes with insight into some design issues pertaining to this study and the nature of the data source (section 5.5).

5.1. CONCEPTUAL FRAMEWORK

In understanding not only the reasons for poor reading achievement, but also identifying those factors that can be associated with successful readers and those with readers at risk of failure, three contextual systems seem to be of major influence in reading achievement, namely the school, the home and the learners themselves.

The conceptual framework for this study aims to guide the analysis process and the interpretation of results. Closely linked to the conceptual framework that was chosen for the purposes of this study is the tripartite curriculum model that characterizes the nature of PIRLS 2006, a model that is shared with other international comparative studies similar to PIRLS 2006.

According to Shorrocks-Taylor and Jenkins (2001), the IEA's tripartite model of the curriculum manifests itself in three ways: what society would like to see taught in the education system (the intended curriculum), what is actually taught (the implemented curriculum), and what is learnt (the attained curriculum). In his sequential explanatory study of factors connected with science achievement in six countries using TIMSS (Trends in International Mathematics and Science Study) 1999 data, Reinikainen (2007) refers to the focus on the curriculum as a broad explanatory factor underlying learner achievement. The manifestations of the curriculum that bore relevance to the TIMSS 1999 study are also significant

for the PIRLS 2006 study. Building on this conceptualisation of the education process, studies like TIMSS and PIRLS seek to assess by means of contextual questionnaires those factors at the level of system, school, teacher and learner that are likely to influence learner achievement. Figure 5.1 (below) illustrates these manifestations of the curriculum:

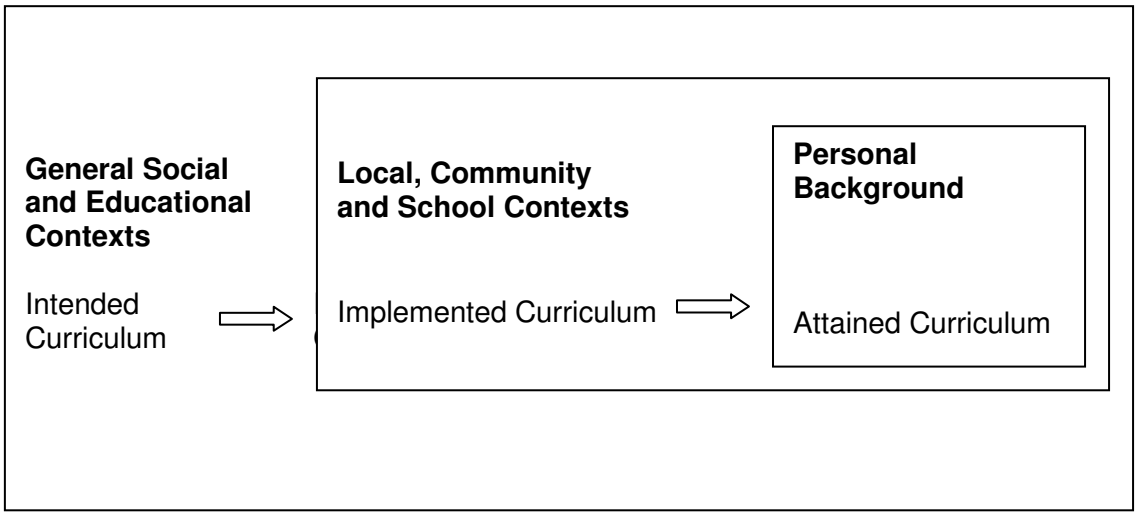


Figure 5.1: Conceptual Framework for International Comparative Studies

The rationale for a country like South Africa to participate in an international comparative study such as PIRLS 2006 should not be regarded as an exercise to determine its standing on a long list of countries. Rather, the conceptual framework provided by the IEA in terms of curricular focus and the differences between what was intended, what was implemented and what was attained should be regarded as the guiding force behind participation, subsequent results and their interpretation.

Before the commencement of this study, the state of reading achievement was explored. This process of exploration entailed general reflections and rudimentary ideas around the reasons for poor reading achievement among children. In imagining what was needed for reading success, initial ideas followed a linear, enabling path beginning with one system, the learner. The initial model included the home as second system and ended with the third system, the school, where enabling factors were imagined to be present to lead to reading success. Some of these enabling factors are aspects the child is likely to encounter first within him- or herself, e.g. the motivation to read and a

steady developmental progress, and that should be present to provide the child with an advantage and preference for reading early in his or her life. In addition to a learner's inner resources, the home factors represent those enabling factors that should be present so as to support success in reading, e.g. reading as a part of the child's daily routine at home, and the home environment which ensures that the child has early pleasurable reading experiences. The third identified system that should build on the enabling factors found in the home and within the child was specifically factors which should be in the school, e.g. effective teaching practices, and provision of frequent opportunities to learn to read.

Given these three systems, with the enabling circumstances present in all three elements, the end result should be an enabled reader who has the ability to read to learn. However, the flipside of an enabling path would also be possible, where the same three systems (the learner, the home and the school) can be characterized by disenabling circumstances, ultimately leading to a disenabled reader who does not have the ability to read to learn.

For the majority of South African fourth grade learners, the picture may be more complex. It is hypothesized that an extensive interaction between the three systems of factors in these two conceptual pathways (to enablement or its converse) is more likely to occur than either of the two stark extreme combinations. In reality there is a plethora of combinations of factors, and each combination may give rise to its own profile of literacy outcomes. For example, a child may come from an enabling home environment, but could have some disenabling factors pertaining to his or her own development that could result in him or her attending an ineffective school environment. These circumstances would likely result in the child not being an enabled reader. On the other hand, a child may come from an ineffective household, but may be developmentally at an advantage and may attend an effective school. This scenario may result in the child being an enabled reader who uses reading to learn. Another scenario might be that of a child from an ineffective household, who despite being developmentally advantaged, may then find him or herself at an ineffective

school, possibly resulting in the child becoming an ineffective, disenabled reader.

It can simply be noted that by allowing for each of the three contexts to be at one of two levels, advantaging or disadvantaging, eight explanatory scenarios can be depicted, in the following way:

	Advantaging (A) Disadvantaging (D) **HOME**	Advantaging (A) Disadvantaging (D) **LEARNER**	Advantaging (A) Disadvantaging (D) **SCHOOL**
Scenario 1:	A	A	A
Scenario 2:	A	D	A
Scenario 3:	D	A	A
Scenario 4:	D	D	A
Scenario 5:	A	A	D
Scenario 6:	A	D	D
Scenario 7:	D	A	D
Scenario 8:	D	D	D

Figure 5.2: Explanatory Scenarios of Advantaging and Disadvantaging Factors Associated with Reading Achievement.

With these initial reflections in mind, Creemers' Comprehensive Model of Educational Effectiveness for schools was used as a point of departure for this study, as this model most closely supports preliminary ideas described in the previous paragraphs and has relevance to already existing reading achievement literature. Creemers' work provides an extensive, multi-level analytical model in this study's attempt to evaluate achievement across language groups.

5.1.1. Creemers' Comprehensive Model of Educational Effectiveness

Creemers' model focuses on the explanation of learner outcomes by alterable educational factors through discerning, contrasting but connected levels of structure for effectiveness in education (Creemers & Reezigt, 1999). Higher levels provide conditions for learner achievement, and educational outcomes are induced by the combined effects of levels. The original model has four levels, namely the learner, classroom, the school and the context (or country).

Kyriakides, Campbell and Gagatsis (2000) regard Creemers' model as an extension of Carroll's model of school learning (1963), which asserts that the degree of mastery is a function of the ratio of the amount of time learners actually spend on learning tasks to the total amount of time they need. According to the Carroll model, time spent on learning is defined as equal to the minimum value of three variables, namely opportunity or time allowed for learning, perseverance or the time learners are willing to spend actively engaging in reading activities and aptitude, understood as the amount of time needed to learn under optimal instructional conditions.

According to Kyriakides et al. (2000), Creemers added to Carroll's model of learning, specifically in respect to the general concept of opportunity to learn. Thus, in Creemers' model, time and opportunity are discerned at the classroom and school-level, making a distinction between actually used time and available opportunity. Bos (2002) explains that Creemers therefore emphasized the availability of time and opportunity at the classroom-level, while at the learner-level referring to actual time used and opportunity to learn. With regards to quality of instruction, Creemers identified three components at the classroom-level, namely curricular materials, grouping procedures and teacher behaviour. According to Bos (2002), by using each of these three components, several combinations of characteristics could constitute the effective scenario. Isolated characteristics are not effective in themselves, because influences on learner achievement are multi-level in nature (Kyriakides & Creemers, 2003).

Creemers based his model on four assumptions, namely that the time-on-task and the opportunity used at the learner-level are directly related to learner achievement. Secondly, the context, school and classroom-levels permeate time-on-task and opportunities used at the learner-level. Thirdly, Creemers stated that the higher level factors dominate conditions and have a partial causal effect upon the lower levels, thus factors at the context (or country) level partly determine factors at the school-level, which in turn partly determine what occurs in the classroom, and lastly classroom factors in turn partly affect learner factors. Fourthly, all of the factors influence learner achievement (Kyriakides & Creemers, 2006).

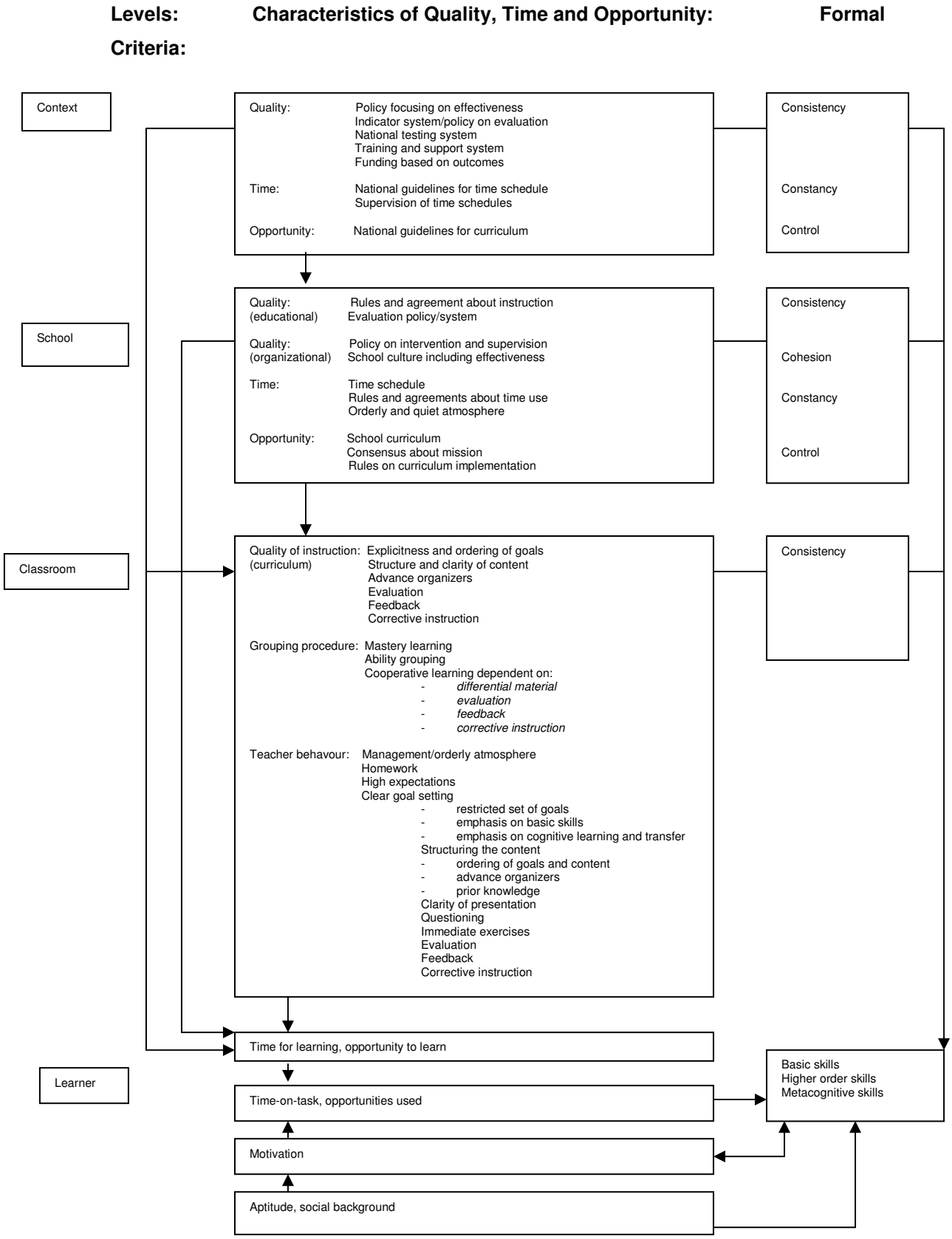


Figure 5.3: Creemers' Comprehensive Model of Educational Effectiveness (Bos, 2002).

Creemers also introduces formal criteria of consistency, cohesion, constancy and control to the model (Creemers & Reezigt, 1999). Consistency occurs when the factors associated with the effectiveness of classrooms, schools and contexts are in support of one another. Consistency is taken care of, requires a prior cohesion present when members of the school team are aware of the need for consistency and act in accordance with what has been agreed upon in the interest of the school. Cohesion requires a suitable constancy of school-level factors from year-to-year, for example, schools should not change their rules and policies on a regular basis. Lastly, control includes not only the evaluation of learners, but also the practice of teachers holding themselves and others responsible for effectiveness. These formal criteria emphasize the importance of factors over time and of mechanisms to ensure effectiveness (Creemers & Reezigt, 1999).

Kyriakides and Creemers (2003) re-worked the original model of Educational Effectiveness and tested what they refer to as the Dynamic Model of Educational Effectiveness. Creemers' original model is based on the assumptions that the influence of learner achievement is multi-level, thereby referring to factors at different levels, including the context (or country), the school, classroom and the learner (Creemers & Kyriakides, 2005). The original model makes provision for direct and indirect relations between the levels that may not be linear in nature, but envisaged somewhat static or simultaneous set of relationships. In the dynamic model, however, the same assumptions are still held true, but Creemers added a provision that the classroom, school and context (or country) factors could also be contrasted or measured across time, by taking into account additional five dimensions namely, frequency, focus, stage, quality and differentiation

According to Creemers and Kyriakides (2005), *frequency* refers to the regularity of occurrence of an activity associated with an effectiveness factor in a country's educational system, school or classroom. Two aspects of *focus* are identified, the first referring to the extent of specificity of the activities (specific to general), the second referring to the purpose for which an activity is taking place. In this proposed dynamic model, *stage* refers to the continuity with which

a factor occurs in order for its direct or indirect effect on learner achievement to be observed. Next, *quality* is also viewed in two ways in the dynamic model, first referring to the properties of a particular factor but secondly also in terms of its impact on the corresponding taught subjects. Finally, *differentiation* refers to the extent to which activities associated with a factor are implemented in the same way for all taught subjects (Creemers & Kyriakides, 2005).

5.1.2. Conceptual Framework for this Study

Bos (2002), in his TIMSS investigation into the benefits and limitations of large-scale international comparative achievement studies, adopted Creemers' model for the purposes of the study. He employed the same four structural levels suggested by Creemers, but revised the components of quality, time and opportunity to suit the needs of his investigation.

A similar approach will be followed for the purposes of this study, where Creemers' Model of Educational Effectiveness (originally developed as a model of school effectiveness) will be revised to constitute a model of reading effectiveness based on data provided by the Progress in International Reading Literacy Study (PIRLS) 2006. The exact nature of the revision will be discussed in the next chapter (Chapter 6), following a detailed discussion and description of PIRLS 2006.

For the purposes of the current study, a decision was also made to make adaptations to the original Comprehensive Model of Educational Effectiveness as proposed by Creemers, rather than the newly revised Dynamic Model. The Dynamic Model makes provision for investigation across time with multiple times for data collection, but for the purposes of this study, the available cross-sectional data was collected at one particular time with no follow-up or repeat measures. The Comprehensive Model of Educational Effectiveness is well established and has been critically reviewed for its validity in studies of educational effectiveness. Creemers (in print) states that although a dynamic model of educational effectiveness is proposed, the original model could

provide a starting point for developing a dynamic model of educational effectiveness research.

5.2. A SOUTH AFRICAN MODEL OF READING EFFECTIVENESS

Table 5.1 shows the adaptations of Creemers' Model to serve as a model of reading effectiveness, using variables from the PIRLS 2006 contextual questionnaires as source.

Table 5.1: Factors of Reading Effectiveness as Adapted from Creemers' Model of Educational Effectiveness

Levels	Components of Quality, Time and Opportunity	PIRLS 2006 Variables
School	Quality (Educational):	Instructional activities and strategies
	Quality: (Organizational)	Governance and organization of educational system
	Time:	Curriculum characteristics and policies
	Opportunities Used:	Home-school connection
Classroom	Quality:	Instructional activities and strategies Demographics and resources
	Time:	Instructional activities and strategies Classroom environment and structure
	Opportunities Used:	Instructional activities and strategies
Learner	Quality:	Activities fostering reading literacy
	Time:	Learners' out-of-school activities
	Opportunities Used:	Home-school connection
	Motivation:	Learners' and parents' reading attitudes and self-concept
	Social background:	Demographics and resources Home resources
	Basic skills/Higher order skills:	Language in the home

The analysis of the PIRLS 2006 achievement and questionnaire data will follow a confirmatory approach, the implication being that, instead of using all variables available to the researcher from the different questionnaires, only a selection of variables that are expected to be related to reading literacy achievement will be used for analysis purposes. In this way, the study is not

guided by the available data alone, but rather existing research into what is known about the factors that are likely to influence learner achievement are utilized in order to have a theory to guide the analysis of data. The reader is therefore asked to be aware that, for the purposes of this study, a confirmatory rather than an exploratory method was chosen.

The following section provides a detailed description of the precise questions taken from the PIRLS 2006 questionnaires that will be used for purposes of analysis as they relate to each identified factor in the adapted model of reading effectiveness (i.e. how the PIRLS 2006 data relate to the framework).

5.2.1. Learner-level Variables

Learner-level variables, as taken from the PIRLS 2006 learners' and parents' questionnaires, include factors such as learner demographics, reading activities outside school, activities fostering reading literacy, reading for homework, the home-school connection, pre-literacy activities, learner attitudes towards reading, the availability of resources and language in the home (Table 5.2).

In establishing relationships between these factors at learner-level and learners' achievement in the PIRLS 2006 reading assessment, the most important factors can be illuminated, with the expectation that the patterns of these variables and the strength of their relationship to reading achievement scores will vary for each language group.

Data is separated according to language grouping, since it is suspected that diverse patterns may be submerged within the data taken in its entirety.

Table 5.2: Learner-level Variables from PIRLS 2006 Questionnaires

Creemers' Com-ponents	PIRLS 2006 Variable	Purpose of Question	Source of Information	Type of Variable	Number of Response Categories
Quality	Activities fostering reading activities	Provides information on the types and frequency of reading activities in school	Learner questionnaire	Ordinal	Between 4 and 5 categories
Time	Reading activities outside of school	Provides information on learners' and parents' reading activities and interests	Learner questionnaire Parent questionnaire	Ordinal	Between 4 and 5 categories
	Reading for homework	Provides information on the types and frequency of reading homework assigned to the learner	Learner questionnaire Parent questionnaire	Ordinal	Between 4 and 5 categories
Opportu-nities Used	Pre-literacy activities	Provides information on the types and frequency in which pre-literacy activities parents engaged the child in before Grade 1	Parent questionnaire	Ordinal	4 Categories
	Home-school con-nection	Provides information on the type and frequency of reading activities and support provided for reading homework	Parent questionnaire	Ordinal	5 Categories
Motivation	Attitudes about reading	Provides information on learners' perceived attitudes and self-concepts toward reading	Learner questionnaire	Ordinal	4 Categories
	Literacy in the home	Provides information on parents' attitudes toward reading and engagement in reading for enjoyment	Parent questionnaire	Ordinal	Between 4 and 5 categories
Social Back-ground	Home resources	Provides information on the availability of basic resources in the home and provides proxy indications of socio economic status of the family	Learner questionnaire Parent questionnaire	Categorical	Between 5 and 21 categories
	Parent demo-graphics	Provides information on the parents' levels of education	Parent questionnaire	Categorical	9 Categories
	Availability of resources	Provides specific information on the availability of library resources in the school, classroom and community	Learner questionnaire	Categorical Ordinal	Between 4 and 5 categories
Basic Skills/ Higher Order Skills	Language in the home	Provided information on the language spoken most frequently in the home, the use of English in the home and the language usually spoken before the child started attending school	Learner questionnaire Parent questionnaire	Categorical	Between 2 and 11 categories

5.2.2. School and Classroom-level Variables

As part of the PIRLS 2006 assessment, School Questionnaires were administered to school principals at each of the sampled schools. Grade 5 teachers of the sample of learners also completed the Teacher Questionnaire. School-level factors include demographics and resources, governance and organization of the educational system within the school, and curriculum characteristics and policies. On a classroom-level, factors that are relevant to building the multi-level model include the classroom environment and structure, reading assessment practices, reading homework, teacher training and preparation, the home-school connection and instructional activities and strategies.

Table 5.3 presents information on those school and classroom variables which have a likely relationship with reading literacy achievement, that have been included for analysis purposes in this study.

Table 5.3: School and Classroom-level Variables As Taken from PIRLS 2006 School and Teacher Questionnaires

Creemers' Components	PIRLS 2006 Variables	Purpose of Question	Source of Information	Type of Variables	Number of Response Categories
Quality (Educational)	Classroom environment and structure	Provides information on the types of reading activities, reading instruction and strategies followed to provide opportunities for learners to read	School questionnaire Teacher questionnaire	Categorical Ordinal	Between 3 and 5 categories
	Reading assessment	Provides information on how teachers assess learners' reading proficiency and how information from assessment are utilized to identify problems, address learner progress and ensure acceptable levels of achievement	Teacher achievement	Categorical Ordinal	Between 2 and 4 categories

Creemers' Components	PIRLS 2006 Variables	Purpose of Question	Source of Information	Type of Variables	Number of Response Categories
	Demographics and resources	Provides information on class sizes, the availability of resources in the school and more specifically the use and availability of libraries in the school, classroom and community.	School questionnaire Teacher questionnaire	Categorical Ordinal	4 Categories
Quality (Organizational)	Governance and organization of educational system	Provides information on teacher collaboration and time spent on school governing activities	School questionnaire	Categorical	Between 2 and 7 categories
Time	Curriculum characteristics and policies	Provides information on the frequency of time-on-task reading instruction	School questionnaire Teacher questionnaire	Categorical Ordinal	Between 3 and 4 categories
	Reading homework	Provides information on the types of and frequency of assigning reading homework to learners	Teacher questionnaire	Ordinal	Between 4 and 5 categories
	Teacher training and preparation	Provides information on how much teachers prefer to read themselves for enjoyment	Teacher questionnaire	Ordinal	4 Categories
Opportunities Used	Home-school connection	Provides information on the schools' efforts to communicate learner performance and progress with parents, and involving parents in parent-teacher initiatives	School questionnaire Teacher questionnaire	Categorical Ordinal	Between 2 and 5 categories
	Instructional activities and strategies	Provides information of opportunities used by teachers to develop learners'	Teacher questionnaire	Ordinal	4 Categories

Creemers' Components	PIRLS 2006 Variables	Purpose of Question	Source of Information	Type of Variables	Number of Response Categories
		reading comprehension skills and strategies			

5.3. RESEARCH QUESTIONS

According to Rule (2006) South Africa has 15 million people who have had less than nine years schooling, with estimations of 4.5 million people who have never been to school. It may well be that a large part of this disadvantaged population could be functionally illiterate and not able to contribute effectively to the economy or benefit from it optimally.

The language policy in the South African national educational system seeks to achieve a number of important imperatives, currently encouraging the use of mother tongue as a clear departure from past practice. The policy aims to introduce a diversity of learning opportunities that have largely been unavailable to learners in the past and promotes effective learning and teaching of previously neglected indigenous languages. For this reason, the policy is not intended to deny learners the opportunity to acquire English or another second language. Rather, its intention is to empower learners by making language-learning opportunities available in all 11 official languages of South Africa as a foundational educational experience and base.

The language policy, adopted in 1997, has not been implemented convincingly at the time of the administration of PIRLS 2006. Resources have not been made available to give effect to the policy and a poor response exists to parents' perceived fears of mother-tongue instruction arising from past practices of apartheid education. In addition to this lack of implementation, the language policy has not received a position of prominence similar to other policy shifts that the educational system has experienced in recent years. The main obstacle faced in promoting mother-tongue learning seems to be the preference by many

parents for their children to be taught in English. To compound this obstacle, many educators have not been adequately trained to teach in English.

This political and policy background paints the context for the study, which aimed to investigate the factors associated with reading performance in the learners' language of learning, as measured in all South Africa's 11 official languages. It should however be stated that the inclusion of language in the investigation did not direct the research to become a linguistic study. It rather aimed to use a reading effectiveness model as point of departure. The degree of fit between theory and gathered data in the form of language-specific results from PIRLS 2006 can be established in a confirmatory fashion. In this way, reading literacy theory is used to identify, illuminate and explain the relationships between factors associated with reading performance of Grade 5 learners in South Africa.

The main research question that guided this research is:

What are the factors that could be associated with Grade 5 learner performance in reading literacy?

Observations and measurements obtained in at least proxy data[3] from the PIRLS 2006 project were used in an attempt to answer this question. Factors emanating from contextual questionnaires of Grade 5 learners, their home environment, their schools and classrooms were identified in conjunction with learners' test scores on the PIRLS 2006 achievement tests. For the purposes of the PIRLS 2006 study, quantitative research methodology was used in the form of survey research. According to Gay and Airasian (2003), underlying quantitative research is the belief that the object of study is relatively stable, uniform and coherent. Thus, it is assumed that a phenomenon (in this case

[3] Proxy data refers to explanatory data that aims to establish relationships between a response and an unobserved, explanatory variable indirectly, by the use of the proxy data in the place of the unobserved explanatory variable. For example, data from contextual questionnaires serve as an approximation of actual conditions and behaviour that are not observed directly, but which may affect reading literacy outcomes.

related to the topic of reading literacy) can be measured, understood and generalizations made.

The main research question can be divided into five sub-questions, the first two of which are:

1. What is the Grade 5 learner performance on the PIRLS 2006 assessment?
2. What is the extent of variation by language groupings in Grade 5 learners' reading literacy performance?

Plausible achievement values will be used for sub-question 1 to describe Grade 5 learner performance per language group for all the learners who completed the PIRLS 2006 achievement booklets. Plausible values are imputed values and are merely estimates that resemble individual test scores. By construction, plausible values are computational approximations with a distribution similar to that of the trait that is being measured and should provide similar and coherent estimates of population characteristics. The use of plausible values is appropriate in situations where individuals are administered too few items to allow precise estimates of their ability. In this case, plausible values will be used as approximations of learner achievement, since large scale studies in developing countries prove to have high levels of missing data (Howie, 2002), thereby making very difficult the task to establish precise estimates of achievement.

For the purposes of answering question 2, descriptive statistics will be used to establish and report any variation in reading literacy achievement between language groupings. For data analysis purposes the IEA's International Database Analyser (IDB Analyser) was used, the results of which are presented in chapter 6. The IDB Analyser is a plug-in for the Statistical Package for the Social Sciences (SPSS) and was developed by the IEA's Data Processing and Research Centre. It was developed specifically to combine and analyse data from large scale data sets such as those designed for PIRLS, the Trends in

Mathematics and Science Study (TIMSS) and the Second Information Technology in Education Study (SITES).

Based on Grade 5 learners' performance on the PIRLS 2006 achievement tests (in reference to sub-question 1), the assumption is that variation will exist between different groupings of learners, in this case particularly based on language grouping. In light of sub-question 2, it is hypothesized that groupings of learners' achievement on reading literacy tasks will differ in level and spread and the sources of variation might be different between different language groupings. In cases where learners struggle to read, the reasons for struggling might be varied. The next two sub-questions therefore aim to investigate the available data for evidence of these sources of variation within the different language groupings of learners participating in PIRLS 2006.

3. What factors related to the learners' background (for example motivation to read, language skills and home environment) affect performance in reading literacy?
4. To what extent do the school and classroom environments affect reading literacy performance?

Factors emanating from the PIRLS 2006 learner and parent questionnaires will be used to inform answers to question 3, while information gathered through the school and teacher questionnaires will be used to answer question 4. For purposes of answering these questions, the HLM 6 software package will be used.

It is expected that some factors might have a direct impact on reading performance, but it is suggested that the relationship between factors and reading performance might not necessarily be linear or direct. An example of a direct, associated relationship between factors and reading performance might be that an enabling home environment will likely lead to the development of an enabled child. An enabling environment is also likely to direct the child to enter an enabling school, thus resulting in a successful reader who has the ability to use reading effectively in everyday life. On the other hand, a disenabling

pathway may arise for a child coming from an ineffective home, who is likely to be at a developmental disadvantage, and is likely to attend a disenabling school environment, characterized by ineffective teaching practices and lack of opportunity for the child to read and learn. The result of such a pathway would be a disenabled reader, who is unable to read to learn.

These examples illustrate two conceptual paths in a simplistic fashion, where one enabling factor leads to the next, resulting in a specified outcome, and, in contrast, one disenabling factor leads to the next, resulting undesirably in a lack of reading ability. Nonetheless, the search for plausible causal conditions is important.

For the majority of South African Grade 5 learners, a picture of more complexity is suspected, where an interaction between factors is more likely to occur. Currently, the South African learner population is characterized by great diversity and variation. At one end of the spectrum a learner from a rural, disadvantaged community with lack of resources might not be able to read. At the other end of the spectrum, a learner from an advantaged, affluent community where resources are readily available might also not be able to read. Just as these learners come from two different socio-economic backgrounds, the factors behind their inability to read also vary greatly. The developmental paths they followed, their cultural, social and individual circumstances, and the influential factors that impacted on their reading abilities may be vastly different, but these paths culminated for both learners in the same result: an inability to read.

An interaction between factors therefore implies a multiplicity of effects of enabling and disenabling factors, resulting in the possibility of a number of configurations that could be used to predict likely learner reading performance.

5. How do these relationships between factors differ or remain constant across the 11 official languages in South Africa, at least in light of the language groupings?

With 11 official languages, current educational policy in the country advocates that learners in Grades 1 to 3 are taught in their mother tongue. When learners progress to Grade 4, for many learners the LOLT changes to a second language, which in most cases is English. At this developmental stage, learners are also expected to advance from learning to read to a stage where they can use reading in order to learn. Using learners' achievement scores as obtained in the PIRLS 2006 assessment when tested in their language of learning, question 5 leads us to investigate whether instruction in one's own native language contributes significantly to the relationship of factors associated with reading performance.

5.4. RESEARCH DESIGN

For the purposes of answering research questions 3-5, Hierarchical Linear Modelling (HLM) (Raudenbush and Bryk, 2002), also known as Multi Level Modelling, will be used. The aim of these analyses would be to establish the relationships between one or more explanatory[4] variables, in this case obtained from items in the contextual questionnaires at learner and school-level, and the outcome variables, i.e. reading achievement scores for the different language groups.

According to Shamosh and Farach (2007), data is hierarchical when observed or measured units are inherently grouped at greater units of analysis and hence may be nested within higher levels of analysis. Nesting can occur between subjects at more than one level, e.g. children nested within classrooms, and classrooms nested within schools, keeping in mind that adding levels of nesting increases the complexity of the model exponentially.

The rationale for using HLM for the purposes of this study is its ability to deal adequately with hierarchical data. In this study, the data can be described as hierarchical in the following sense: The data consists of variables that describe

[4] The term 'explanatory' explicitly suggests the role with respect to a 'response' or 'outcome' variable. These terms replace the potentially misleading terms: independent and dependent

individuals, but the individuals are also grouped into larger units (classes) consisting of a number of individuals, which in turn are described by higher order units. Data is therefore available for explanatory variables that describe Grade 5 learners, which in turn describe classes in a representative sample of schools across South Africa.

According to Raudenbush and Bryk (2002), data of this nature has a nested structure of learners within classrooms and classrooms within schools. With hierarchical linear models each of the levels is formally represented by its own sub-model. The sub-models express relationships among variables within that given level and specify how variables at one level can influence relationships found at another level.

O'Connell and McCoach (2008) point to the importance of multi level analysis with data of a hierarchical structure. With learners nested within classes, and classes nested within schools, these grouping effects imply that learners are no longer independent and that their responses are correlated, and hence in the loss of independence among observations. This loss of independence constitutes a serious violation of key assumptions underlying a large body of parametric statistical procedures, but is properly accounted for through the use of multi level analyses.

Willms (1999) describes HLM as a particular regression technique that takes into account the hierarchical structure of educational data, and understandable in terms of two steps:

1. Analysis is conducted on every school (or some other unit) in the system using student level data. For example, students' test scores in reading literacy (outcome measure of interest) could be regressed on a set of student level predictor variables.
2. The regression parameters from the first step of the analyses (levels of performance and extent of inequalities) become the outcome variable of interest. These variables are regressed on school-level data describing schooling processes.

The work of Ma and Klinger (2000) is similar to the aims and objectives of this study. Because education systems have a hierarchical structure (students are nested within schools), researchers must examine both student and school characteristics. These authors used student-dependent scores as dependent (or response or outcome) measures and student characteristics and school context as taken from questionnaires as independent (or explanatory) measures in a two-level Hierarchical Linear Model to examine the effects of student and school variables on academic achievement at the student and school-levels (students nested within schools).

Each HLM analysis was carried out in three stages. During the first stage, the analysis produced a null model with no explanatory variables at student or school-level. During the second stage, explanatory student variables were added to the null model, first singly and separately, to determine whether each variable had a statistically significant absolute or marginal effect on academic achievement measures regardless of other variables and whether its relationship varied significantly across schools, then in combination, to determine whether each explanatory variable had statistically significant relative effect on the academic achievement measures in the presence of other variables. In other words, the relative or combined effect of the explanatory variable was adjusted for the presence of simultaneous effects of other explanatory variables. During the third stage, explanatory school variables were included in the student model, first singly and separately to determine their absolute (or marginal unique) effects, then in combination, to examine their relative (or conditional simultaneous) effects.

The work of Ma and Klinger (2000) illustrates similar aims and procedures to this study, namely to model average reading literacy achievement measures and school variables, and relationships between them. Figure 5.4 represents possibilities of relationships among variables in this study. For the purposes of this study, a two level model is suggested, with learner-level variables nested within school-level variables. School and classroom-level variables are grouped together in one level, since variables at these levels cannot be separated from one another. The PIRLS 2006 sample was drawn so that one intact classroom

was chosen from each selected school, thereby making classrooms inextricably part of the school.

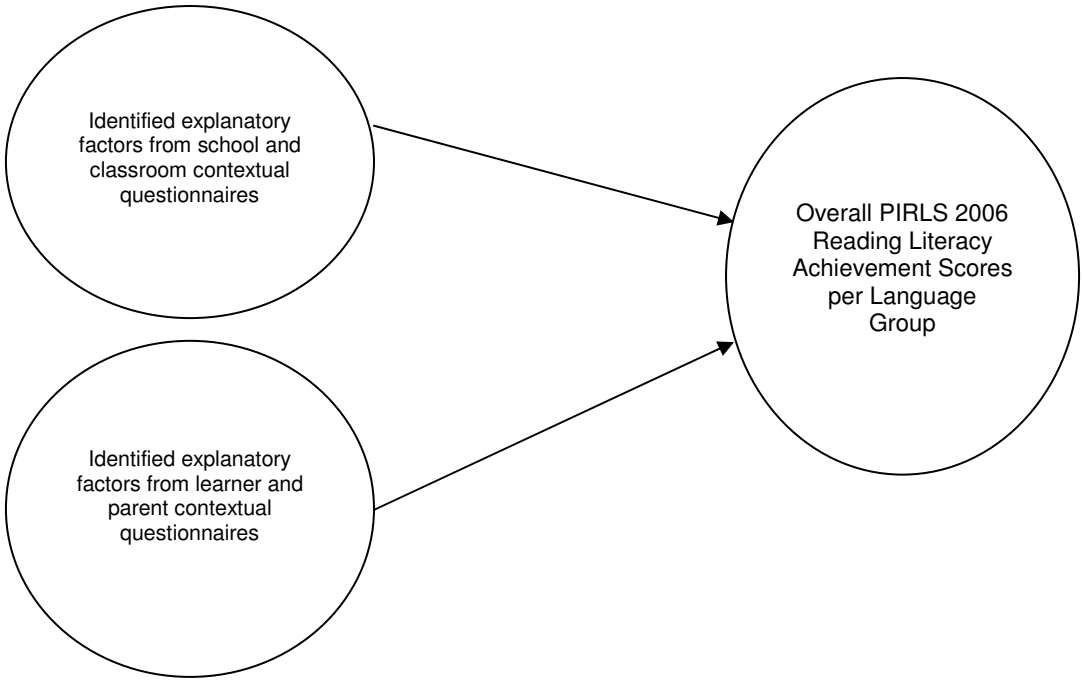


Figure 5.4: A Two Level Model of Variables Associated with Reading Literacy Achievement

HLM models are a type of mixed model with hierarchical data that exists at more than one level (Snijders & Bosker, 2002). HLM focuses on differences between groups in explaining a dependent (or response or outcome) variable. The focus is on any group effects on a response in relation to explanatory or predictor covariates. Mixed models explore both fixed and random effects on a response variable, but also permit use of covariates as plausible predictors. Explicitly stated, and in light of Figure 5.2 on page 123, the focus of this study is reading literacy achievement by learner, by school, controlling for language grouping. With this conceptualisation, reading literacy achievement would be regarded as the response variable, the learner the unique factor (as selected from intact classrooms), the school the random factor, with the language grouping as the covariate (or predictor). Stated in another way, this model translates to:

Reading literacy score = ((average + adjustment applicable for school i) + (adjustment applicable for language j) + (adjustment for learner k knowing the school and the language)).

Raudenbush and Bryk (2002) caution that:

> a natural temptation is to estimate a 'saturated' level 1 model - that is where all the predictors are included with random slopes – and then to work backward deleting non-significant effects from the model. Unfortunately, such a strategy is generally not useful unless the level 1 sample sizes are very large. Even then, such a saturated model might require hundreds of iterations to converge and often will produce a large array of non-significant findings that offer little direction as next steps. If one overfits the model by specifying too many level 1 random coefficients, the variation is partitioned into many little pieces, none of which is of much significance. (Raudenbush & Bryk, 2002).

Instead, Raudenbush and Bryk (2002) advise that it is more productive to use a 'step-up' strategy, where some external theoretical guidance has defined a relatively small set of level 1 predictors, and is used to build up from univariate to multivariate models based on promising sub-models. The following section describes how such a theoretical guide and conceptual framework is used for the purposes of data analysis in identifying a small set of predictors from both learner and school-levels.

5.5. DESIGN ISSUES

In this section, some design issues are discussed and related to aspects already discussed in Chapter 4, such as the realized sample for PIRLS 2006 (section 5.5.1), the development and translation of instruments (section 5.5.2), the distinction between first language, language of the test and language of learning (section 5.5.3) and drawing causal conclusions in this study (section 5.5.4).

5.5.1. Sample

The South African sample for PIRLS 2006 consisted of 441 schools, all of which offer schooling at least at Grade 4 level. From an initial 15 182 schools, the South African sample was selected on the basis of probabilities proportional to size, first by province and then by language of teaching within province, to arrive at this intended sample of 441 schools. Information on seven of the selected schools was absent to such an extent that these schools could not be traced. Thus, the PIRLS 2006 study resulted in the collection of achievement data from a realized sample of 434 schools comprising 16 288 Grade 4 learners aggregated from all nine provinces in all 11 official languages. For Grade 5 learners, data collection culminated in the assessment of 14 657 learners from intact classrooms from the same schools that were selected for the assessment of Grade 4 learners.

5.5.2. Instrument Design and Translation

The PIRLS 2006 data collection instruments consist of reading achievement booklets comprising reading comprehension passages with accompanying questions in various formats. As part of assessing reading comprehension and understanding the contexts in which Grade 5 learners read, the assessment also included the administration of questionnaires to school principals, teachers, parents and learners. The data collection instruments were all developed in a collaborative effort across the participating countries, but ultimately all data collection instruments were developed in English and were the result of extensive work of reading development groups and pilot processes undertaken in participating countries.

There are two important aspects of the South African PIRLS 2006 study that should be borne in mind. Firstly, the magnitude of this study: instruments were replicated 11 times for administration on learners representing all 11 official languages of South Africa. In some cases, learners experienced great difficulty in responding to the PIRLS 2006 reading passages. Some of these difficulties

might be expected to be associated with translation issues. Of the PIRLS 2006 participating countries, South Africa proved to have the most complex situation by far, in terms of the number of indigenous languages. Contextual questionnaires and assessment instruments were translated from English into all 10 other official languages. The International Study Centre conducted one round of translation being followed by a round of back translations, and then international translation verification. Despite translation difficulties, South Africa passed the international translation verification process with requests for minor changes in some cases.

Despite stringent translation procedures, language and cultural complexities highlighted the importance of acknowledging diverse cultures in cross-national studies of this nature. The best attempts were made to ensure the equivalence of instruments between the different languages. However, learners still experienced difficulties, resulting in many test booklets being returned unanswered and incomplete. Possible reasons other than severe inability to engage material at Grade 4 level, emerge from the anecdotal evidence of personal observations made during data collection, namely that learners in many schools across the country seem to be enrolled in schools where the LOLT differs from their own recorded mother tongue.

5.5.3. The Distinction between First Language, Language of Learning and Language of the Test

A third design issue pertains to the distinction made in this study between ‘first language’, ‘language of learning’ and ‘language of the test’. South African children are by policy intended to start their learning at school from Grade 1 to 3 in their first language (mother tongue). However, many schools are faced with teaching learners in these initial grades in a language of learning that is nonetheless different from what is spoken at home. For Grade 1 to 3 learners, ‘first language’ does not necessarily coincide with ‘language of learning’ or ‘language of the test’. When learners approach Grade 4, the language of learning changes again, resulting in more than 80% of learners being taught in

a dominant second language (mostly English, a language spoken as another tongue by less than 10% of the population).

For the purposes of data analysis in this study, language groups are therefore defined by means of 'language of learning' (in Grades 1 to 3), since the term 'first language' is not accurately indicative of whether a learner does in fact receive instruction in his or her home language. The terms 'language of learning' and 'language of the test' will be used interchangeably, even it is functionally possible that at some schools the equivalence is moot.

5.5.4. Drawing Causal Inferences from PIRLS 2006 Data

The concept of causality is used with great care in this study, since causal conclusions cannot be drawn from non-experimental data. Instead, this study seeks to generate associations and directions of relationships between explanatory and outcome variables. Blunch (2008) states that, while it is not possible to observe causation from observation, it is possible to observe to other relationships, namely:

1. Co-variation, which permits an inference that, if two factors co-vary, there is a possibility but not the necessity of a causal relationship in one direction or another.
2. Time sequence, where the occurrence of A being followed by B is a necessary condition for A being a cause of B, but may not be a sufficient condition.

A requirement for these relationships to become evidence of causation specified in a hypothesis is that they are to be observed with high frequency under conditions that rule out all other explanations of the observed relationships than that of the hypothesized causation.

It should be noted here that for the purposes of this study, particularly in the discussion of results in chapters to follow, the aim is not for findings to point to causality or in providing evidence for a causal relationship among any of the

variables used in the model. At the most, some causal relationships could be rendered plausible or probable on the basis of the data. Since it is not possible to rule out all other explanations or factors that influence reading achievement, and since one is restricted by what the data set and its structure can provide, the aim of the analysis is to attempt to identify those factors which might be deemed most ‘probable’ in plausible claims of the form that ‘factor A contributes substantially reading literacy achievement for a particular language group’.

CHAPTER 6: EXPLANATORY VARIABLES AT LEARNER, CLASS AND SCHOOL-LEVELS AND PIRLS 2006 ACHIEVEMENT

"Reading makes immigrants of all of us. It takes us away from home, but more important, it finds homes for us everywhere."

Jean Rhys

The PIRLS 2006 assessment is the second of a series of international comparative studies that is to be undertaken in five year cycles. After absence from the PIRLS study undertaken in 2001, South Africa's first participation took place in the 2006 cycle. As an international comparative study, PIRLS 2006 not only provides the 45 participating education systems with the opportunity to assess reading literacy achievement, but also an opportunity for those 28 countries that are participating for a second time to establish 5-year trends in reading literacy achievement worldwide. As a trend study, PIRLS retains a selection of reading passages to allow for the repeat administration of that selection in future assessment cycles, thus allowing for comparisons within and across countries to be made from one cycle of assessment to the next.

This chapter will focus on South African Grade 5 learner performance in the PIRLS 2006 assessment as measured internationally, and separately in relation to variables such as gender, achievement between provinces, benchmarks per language and achievement per test language. In addition, descriptive information will be elaborated about the explanatory variables selected for the purposes of this study, at learner, home, teacher and school-level.

6.1. SOUTH AFRICAN READING ACHIEVEMENT AND INTERNATIONAL COMPARISON

A total of 40 countries and 45 education systems participated in PIRLS 2006. The slight disparity in numbers is accounted for by two countries having more than one education system, namely Belgium, with a French and Flemish

system, and Canada with no fewer than five distinct systems. Table 6.1 lists all the participating countries and education systems, and distinguishes between those 28 systems that have participated in both PIRLS 2001 and PIRLS 2006, and the 17 systems that participated only in PIRLS 2006.

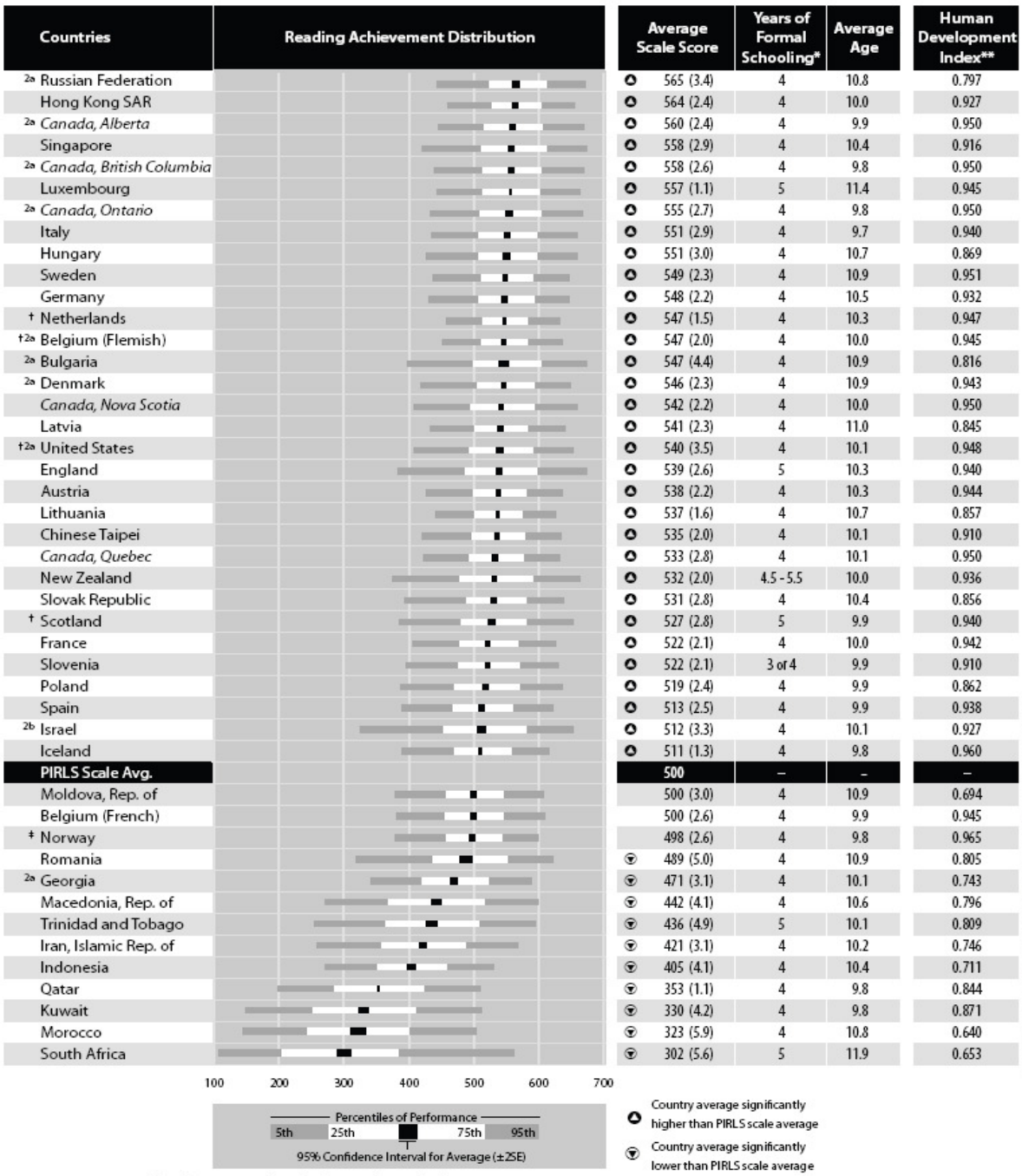
Table 6.1: PIRLS 2006 Participating Countries and Education Systems

PIRLS 2006 & 2001		PIRLS 2006
Bulgaria	Macedonia	Austria
Canada, Ontario	Moldova	*Belgium (Flemish)*
Canada, Quebec	Morocco	*Belgium (French)*
England	Netherlands	*Canada, Alberta*
France	New Zealand	*Canada, British Columbia*
Germany	Norway	*Canada, Nova Scotia*
Hong Kong SAR	Romania	Chinese Taipei
Hungary	Russian Federation	Denmark
Iceland	Scotland	Georgia
Iran	Singapore	Indonesia
Israel	Slovak Republic	Kuwait
Italy	Slovenia	Luxembourg
Latvia	Sweden	Poland
Lithuania	United States	Qatar
		South Africa
		Spain
		Trinidad and Tobago

The PIRLS 2006 Summary report (Howie, Venter, van Staden, Zimmerman, Long, Scherman & Archer, 2009) states that, of the participating PIRLS 2006 education systems, South Africa had the highest infant mortality rate (53 per 1000 live births), the lowest life expectancy (46 years) and the highest learner: teacher ratio. In terms of budgetary expenditure as a percentage of the Gross Domestic Product (GDP) on education, South Africa is ranked average amongst participating countries, with 14.3% expenditure per learner as measured in 2006 (World Bank, World Development Indicators, 2008).

The IEA released the PIRLS 2006 international reading literacy achievement results on 28 November 2007 at Boston College in the United States of

America. The results provided overall reading averages achieved by each participating country. Through the use of Item Response Theory (IRT) scaling (further details in PIRLS 2006 Technical Report, Martin, Mullis & Kennedy, 2007), the PIRLS 2006 international average is set at a fixed 500 points with a standard deviation of 100 points. Participants' achievement is therefore ranked and placed relative to the international reference mean of 500. Figure 6.1 provides the distribution of reading achievement as taken from the PIRLS 2006 International Report (Mullis, Martin, Kennedy & Foy, 2007), together with years of formal schooling, average age and the Human Development Index.



SOURCE: IEA Progress in International Reading Literacy Study (PIRLS) 2006

* Represents years of schooling counting from the first yearof ISCED level 1.

** Taken from United Nations Development Programme's *Human Development Report 2006*, p. 283-286, except for Chinese Taipei taken from Directorate General of Budget, Accounting and Statistics, Executive Yuan, *R.O.C. Statistical Yearbook 2005*. Data for Belgium (Flemish) and Belgium (French) are for the entire country of Belgium. Data for England and Scotland are for the United Kingdom.

† Met guidelines for sample participation rates only after replacement schools were included (see Exhibit A.7).

‡ Nearly satisfying guidelines for sample participation rates after replacement schools were included (see Exhibit A.7).

2a National Defined Population covers less than 95% of National Desired Population (see Exhibit A.4).

2b National Defined Population covers less than 80% of National Desired Population (see Exhibit A.4).

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

NOTE: See Exhibit C.1 for percentiles of achievement in reading.

Figure 6.1: Distribution of International Reading Achievement

PIRLS 2006 required the assessment of learners who have had four years of schooling, which for most countries translated to Grade 4 learners. The South African PIRLS 2006 study assessed this first population of Grade 4 learners, but also included a second population of Grade 5 learners as a national option within the study. Figure 6.1 indicates that South Africa achieved the lowest score of the 45 participating education systems. Figure 6.1 only provides results for South Africa's Grade 5 population. With an average age of 11.9 years, the South African learner population was the oldest across all participating countries. Grade 4 learners achieved on average 253 points (SE=4.6), while Grade 5 learners achieved on average 302 (SE=5.6). Average achievement for both these grades is substantially below the fixed international reference average of 500 points. Closest to South Africa in reading achievement was Morocco, the only other African country that participated in PIRLS 2006, with a Grade 4 average of 323 points (SE=5.9).

The remainder of this chapter will only provide and discuss results that pertain to Grade 5 learner achievement (sections 6.2 and 6.3) and an analysis of results of selected variables as described in Chapter 5 relevant to this study from the Learner, Parent, Teacher and School questionnaires (section 6.4).

6.2. SOUTH AFRICAN GRADE 5 ACHIEVEMENT BY LANGUAGE, GENDER AND PROVINCE

The PIRLS 2006 reading assessment was administered to a sample of 14 657 Grade 5 learners aggregated across all 11 official languages. It has to be borne in mind that the results for each language refer to the language of the test, not the home language. The language of the test is the language that should coincide with the language in which the learner has been taught for the first three years of schooling, and therefore may be different from the learner's home language.

Figure 6.2 illustrates achievement per language for Grade 5 learners. Learners who wrote the test in Afrikaans (n=1678) achieved the highest scores (416,

SE=12.0), followed by those who wrote it in English (n=2793, achievement of 398, SE=17.1). A substantial drop in achievement is illustrated for learners who wrote the test in isiNdebele (n=798, achievement of 239, SE=12.2) and isiXhosa (n=1470, achievement of 215, SE=7.6), who were the lowest achievers. Learners who wrote the test in Sesotho (n=959, achievement of 288, SE=7.6) achieved better scores than their counterparts of the other African languages.

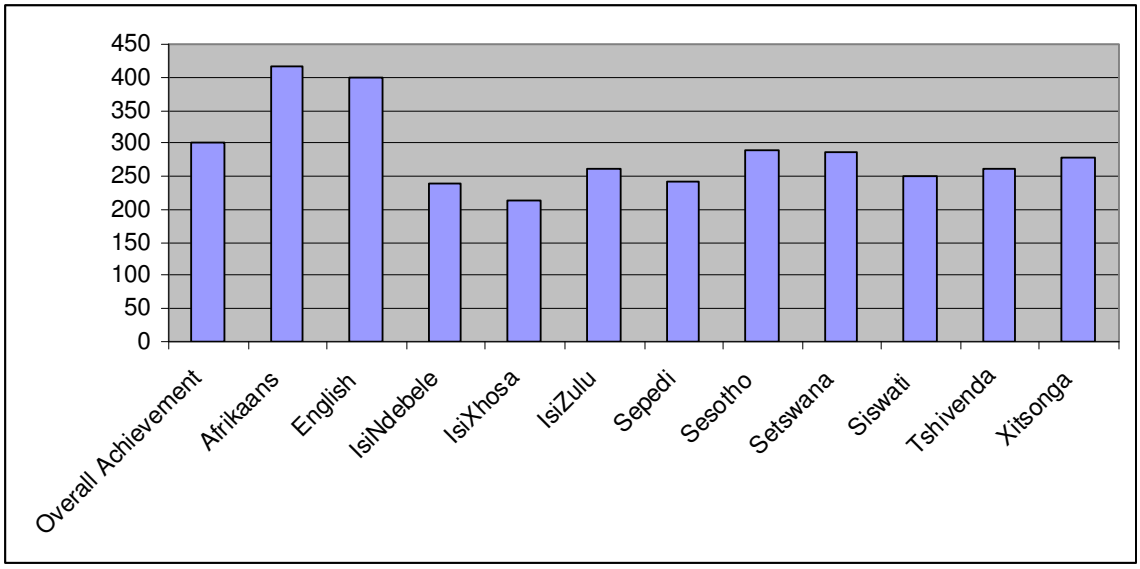


Figure 6.2: Grade 5 Achievement by Language

South African Grade 5 learner achievement by gender is consistent with international patterns. Internationally, girls outperform boys, and for South African Grade 5 learners this pattern holds true where Grade 5 girls achieved on average 319 points (SE 6.3) and Grade 5 boys achieved 283 points (SE=5.5), a difference in average achievement of 36 points, yet statistically not significant (p=0.38). According to Howie et al. (2007), this difference in achievement by gender for South African Grade 5 learners is among the highest in the world.

South Africa has nine provinces and achievement varies greatly between them. Table 6.2 indicates participant counts and average reading achievement per province:

Table 6.2: Average Achievement Scores per Province

Province	N	Average Reading Achievement	SE
Eastern Cape	1 629	241.71	15.5
Free State	1 229	308.87	7.1
Gauteng	1 436	353.49	17.8
KwaZulu-Natal	1 681	313.97	11.3
Limpopo	2 959	255.75	4.8
Mpumalanga	2 950	270.14	7.3
Northern Cape	749	357.42	14.3
North West	1 050	310.08	14.0
Western Cape	974	404.21	13.5

A one-way ANOVA with post hoc tests shows significant differences in average reading achievement between provinces, with the Western Cape achieving significantly higher scores than the other provinces. Achievement scores formed distinct groups, firstly with the Northern Cape and Gauteng, with significantly lower achievement scores than the Western Cape, but higher than the cluster of KwaZulu-Natal, North West and the Free State. The cluster Mpumalanga, Limpopo and Eastern Cape performed significantly lower than the other six provinces. These provincial differences are of course partially confounded with associated language effects.

The following section describes Grade 5 learner benchmark achievement by language.

6.3. SOUTH AFRICAN GRADE 5 LEARNER BENCHMARK ACHIEVEMENT BY LANGUAGE

The PIRLS 2006 assessment measures learners' reading achievement on a variety of reading passages and questions about the reading passages, each target selected processes of comprehension (Howie et al., 2007). These processes of comprehension range from the more basic types, by which the learner should be able to focus on and retrieve explicitly stated information and make straightforward inferences, to the more complex processes assessed by

PIRLS 2006, which include the ability to interpret and integrate ideas and information, and ultimately evaluate and examine content, language and textual elements. The processes of comprehension follow a hierarchy from easy to difficult, requiring the learner to apply increasingly complex reading skills and abilities. However, Howie et al. (2009) point out that interpretive questions are not necessarily more difficult by default, since comprehension processes may vary for each learner in accordance with their experiences.

Figure 6.3 presents the percentages of learners in the benchmark categories with highest at left and lowest at the right. It illustrates the difference between the international patterns of achievement on each of the benchmarks and South African Grade 5 learner benchmark achievement patterns. Nationally, as little as 6% of learners are able to reach or exceed the High International Benchmark for Grade 5 competence, in comparison to 41% internationally. Moreover, as many as 78% of South African Grade 5 learners were unable to reach the Low International Benchmark at all, in contrast to only 6% internationally. International patterns show a substantial spread of achievement across each of the benchmarks, yet the South African pattern paints a very bleak picture of devastating underachievement.

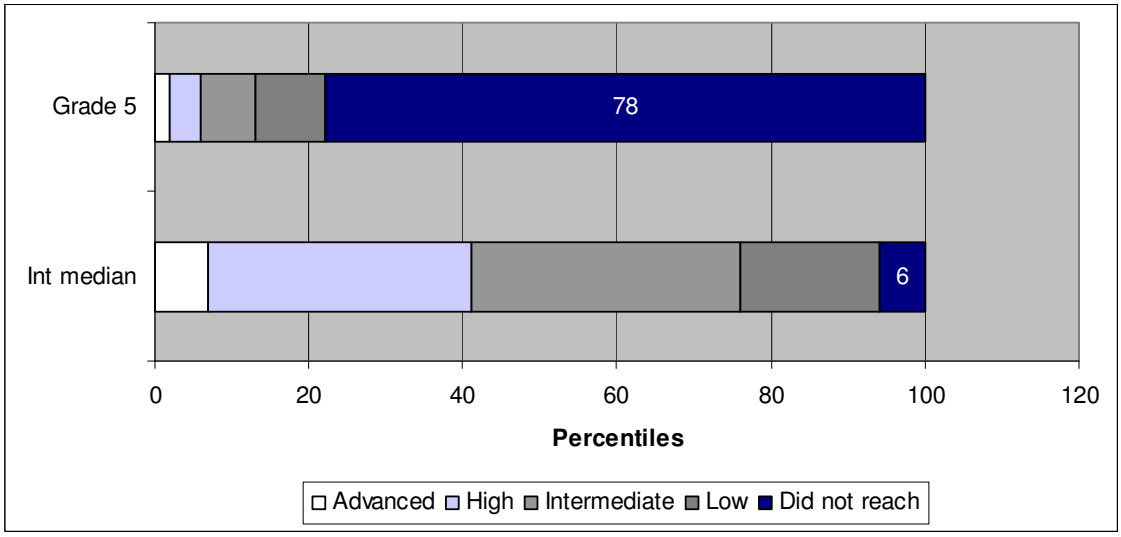


Figure 6.3: International Benchmark Achievement Patterns Compared to South African Grade 5 Benchmark Achievement Patterns

Each of the PIRLS 2006 questions is benchmarked to provide detailed qualitative descriptions of the learners' performance on a scale represented by four levels. With the international average set at 500, the range of performance exhibited by learners can be classified as follows:

- Advanced International Benchmark (set at 625 points),
- High International Benchmark (set at 550 points),
- Intermediate International Benchmark (set at 475 points)
- Low International Benchmark (set at 400 points).

The descriptions of each of these benchmarks are cumulative, that is learners who were able to reach the higher benchmarks would automatically be able to demonstrate the skills and abilities which are expected at the lower benchmarks.

At the Advanced International Benchmark, learners are able to respond to the PIRLS 2006 assessment fully. Learners are able to integrate information across challenging texts and can provide full text-based support for their answers (Howie et al., 2007). At the High International Benchmark, learners are considered to be competent readers. Learners who are able to reach the High International Benchmark can retrieve significant details embedded across texts, and at this level they are able to begin to identify main ideas and some textual features and elements, as well as being able to begin to integrate ideas and information across texts.

Learners at the Intermediate International Benchmark show some reading proficiency. They are able to understand the literal plot of a text and to make some inferences and connections across texts. At the Low International Benchmark, learners are capable of basic reading skills and strategies and are able to recognize, locate, and reproduce information that was explicitly stated, especially if it was placed at the beginning of the text. At the Low International Benchmark, learners are able to make straightforward inferences.

Howie et al. (2007) cautioned that the PIRLS 2006 reading passages varied in length, syntactic complexity, vocabulary use, abstractness of ideas, layout and organisational structure. The benchmarks were developed on the basis of these particular texts and for the purposes of the PIRLS 2006 assessment only. The descriptions provided by each benchmark do not encompass all reading skills and abilities of Grade 5 learners, but are specific to the PIRLS 2006 assessment.

The PIRLS 2006 international report places learner achievement on the benchmark into context, whereby countries with the highest average achievement in general had greater percentages of learners reaching each of the higher benchmarks than countries with on average lower achievement scores. Lower average achievement countries have greater percentages of learners categorised into the lower benchmarks. Howie et al. (2007) explain that 97% and 98% of learners from the highest achieving countries (the Russian Federation and Singapore respectively) were able to reach the Low International Benchmark. A further 86% to 90% were able to reach the Intermediate International Benchmark, while between 58% and 61% of learners from these countries reached the High International Benchmark. As many as 19% of learners from these countries were able to reach the Advanced International Benchmark.

Lower achieving countries are in stark contrast to the percentages reached by high achieving countries. In South Africa, only 2% of Grade 5 learners were able to reach the Advanced International Benchmark. The following section will describe South African Grade 5 learners' achievement on each of the benchmarks, with particular reference to achievement within the groups defined by language of testing.

Figure 6.4 illustrates benchmark achievement for South African Grade 5 learners specifically for each of the 11 official languages, again with percentages accumulating from the highest to lowest groups. More than 90% of learners who wrote the PIRLS 2006 assessment in isiNdebele, isiXhosa, isiZulu, Sepedi, Siswati, Tshivenda, and Xitsonga were unable to reach the Low

International Benchmark for Grade 4. Similar outcomes occur amongst for Setswana and Sesotho learners, of whom more than 80% were also unable to reach the Low International Benchmark. Achievements of Afrikaans and English Grade 5 learners were relatively better, with 45% of Afrikaans learners and 48% of English learners unable to reach this benchmark. Nonetheless, while these percentages are more favourable than those of the African languages, they are far below international patterns, where only 6% of Grade 4 learners are unable to reach the Low International Benchmark.

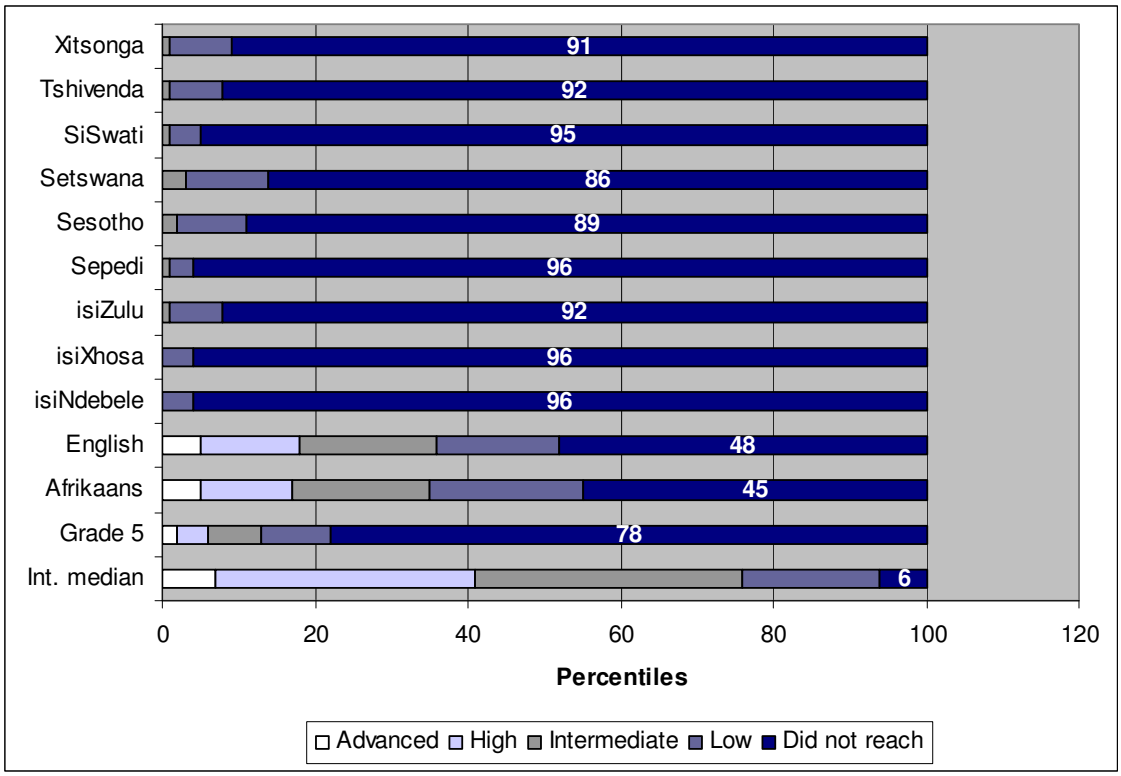


Figure 6.4: South African Grade 5 Benchmark Achievement per Language

Figure 6.4 also shows that 55% (SE 0.3%) of Afrikaans Grade 5 learners and 52% (SE 0.7%) of English learners reached or exceed the Low International Benchmark. The corresponding percentages for the African languages were

Figure 6.4 also shows that 55% (SE=0.3%) of Afrikaans Grade 5 learners and 52% (SE=0.7%) of English learners reached or exceeded the Low International Benchmark. The corresponding percentages for the African languages were substantially lower, with only 4% (SE=0.2%) of isiNdebele learners and 5%

(SE=0.9%) of Siswati learners reaching or exceeding the Low International Benchmark.

From Figure 6.4 it may also be inferred that none of the Grade 5 isiNdebele and isiXhosa learners were able to exceed the Low International Benchmark for Grade 4. Fewer than 10% of isiZulu, Sepedi, Setswana, Sesotho, Siswati, Tshivenda and Xitsonga learners were able to reach the Intermediate International Benchmark, meaning that more than 90% of these learners had not attained reading proficiency in the language of testing.

A total of 17% (SE=0.2%) of Afrikaans Grade 5 learners and 18% (SE=0.1%) English learners were able to reach the High International Benchmark. These small percentages imply that few Grade 5 learners in these two languages in South Africa can be considered competent Grade 4 readers. None of the Grade 5 learners from the African languages were able to reach the High International Benchmark.

A similar picture emerges for the Advanced International Benchmark. For both Afrikaans and English Grade 5 learners 5% (SE=0.9% and 1.3% respectively) of learners reached the Advanced International Benchmark, while no African language learners were able to reach it.

In summary, the overall performance of South African Grade 5 learners in the PIRLS 2006 assessment of Grade 4 competencies was the lowest for all participating countries, and stark differences exist for reading achievement between gender, provinces and language groups.

South African Grade 5 learner performances against the international Grade 4 benchmarks are cause for great concern and provide a clear indication that the vast majority of learners (specifically from the African languages groups) cannot be regarded as competent readers who are in possession of basic skills to read with any measure of success.

6.4. LEARNER-LEVEL EXPLANATORY VARIABLES

This study examines the predictors of reading literacy achievement per language group on two levels, namely the learner-level and the school-level. These predictors and levels have been selected based on the criteria in Chapter 5 and the conceptual framework. The following section will describe the characteristics of Grade 5 learners who participated in PIRLS 2006, focussing on the averages scores associated with those explanatory variables that have been selected from the Learner Questionnaire and that are related to the conceptual framework as outlined in Chapter 5. Variables related to the time learners spend on reading, the opportunities they use to read, their motivation to read, their social background and their language skills will be discussed.

6.4.1. Time on Task

Time on task is defined as the average reported time learners spend on reading outside of school. Grade 5 learners who reported that they read aloud to someone at home once or twice a month achieved substantially higher scores (354.8, SE=10.1)[5] than those learners who reported having read aloud every day or almost every day (278.1, SE=4.7), or once or twice a week (327.6, SE=7.6). To spend time listening to reading seems to have least evidence of positive impact on reading achievement, since learners who reported never doing so achieved substantially higher (349.9, SE=13.3) than those who reported doing so every day or almost every day (287.0, SE=3.9). Similar patterns occurred for those learners who reported never or almost never talking to friends about what was read (359.4, SE=11.2) and those who reported doing so daily (288.7, SE=4.3).

In terms of reading for fun activities outside of school, those learners who reported spending time once or twice a week achieved the highest score of all categories within that question (314.4, SE=6.3). Learners who reported reading

[5]The convention for reporting reading achievement in this chapter provides the average reading achievement score, followed by the standard error (SE), both rounded to one decimal.

for information once or twice a week also achieved the highest scores of all categories for that corresponding question (317.8, SE=9.1).

Reported reading for fun outside of school is linked to learners' attitudes toward reading and the frequency with which they engage in it. Reading for fun was reported most frequently in the international report by countries such as the Russian Federation, Germany, Lithuania, Moldova and Canadian provinces of Alberta and British Columbia (Mullis et al., 2007). South African learner percentages are consistent with international averages of 40%, where learners indicated reading for fun every day or almost every day. Some 49% (SE=1.1%) of South African Grade 5 learners reported reading for fun every day or almost every day.

With such a relatively high percentage of learners who reportedly read for fun every day, one would expect that learners who do so would achieve on average higher. Yet, for the South African Grade 5 data this inference is not necessarily true. Learners who read stories or novels (309.7, SE=6.7) or magazines (315.3, SE=6.2) once or twice a week achieved only marginally higher scores than those learners who reportedly do so every day (307.7, SE= 6.4), once or twice a month (296.9, SE=7.9) or almost never (291.3, SE=8.3).

Learners who reportedly read newspapers (328.3, SE=7.3) or comic books (350.0, SE=10.4) less frequently than once or twice a month achieved the highest scores. Learners who reportedly read subtitles on television achieved the highest scores when this activity was done every day or almost every day (328.8, SE=5.9).

An alarming 37.9% (SE=1.0%) Grade 5 learners reported watching television for 5 hours or more every day, with a significant difference in achievement within this TV watching group between boys and girls (boys' achievement 270.1, girls' achievement 301.2, p=0.035). While 26.8% (SE=0.8%) of learners reported spending more than 5 hours reading books, their reading achievement scores are not reflective of the amount of time they spend reading. For these learners, reading achievement scores are only (285.9 SE=5.2) as opposed to

higher achievement scores for learners who reportedly only spend up to one hour reading (371.7, SE=0.1).

Table 6.3 illustrates the amount of time learners reportedly spend on reading homework, and its associated effect with reading achievement:

Table 6.3: Time Spent on Reading Homework and Associated Reading Achievement

Time Spent on Reading Homework	N	% of Learners	SE %	Reading Achievement Scores
Never	2 318	18.9	0.88	267.9
Half hour or less	3 676	32.9	0.89	340.5
More than half hour to one hour	3 016	26.1	0.61	312.6
More than one hour	2 823	22.1	0.59	316.1

A majority of 30.2% (SE=0.6%) of parents reported that the amount of time their children spend doing homework only amounts to between 16 and 30 minutes every day. Parents' own reading behaviours reveal that the majority 35.0% (SE=0.6) only spend between 1 and 5 hours reading per week. An alarming 29.41% (SE=0.2) of parents reported spending less than an hour reading at home. The amount of time children spend doing homework as assigned by their teachers therefore seems very little, and is comparable to parental reports of similarly little time set aside and spent on reading activities in the home.

6.4.2. Opportunities Used

Opportunities used at the learner-level refers to those used by teachers (as reported by learners) to engage them in reading activities. In terms of the opportunities used in the classroom to spend time on reading, 74.7% (SE=0.8%) of Grade 5 learners reported that their teachers most often used the time to read aloud to the whole class. Smaller percentages of learners reported on opportunities that were used on a daily basis for them to read aloud in groups 34.6%, (SE=0.9%). In terms of independent reading, 57.7% (SE=1.2%)

of learners reported reading silently on their own every day or almost every day, while an equally high percentage reported reading books of their own choosing 52.2%, (SE=1.0%).

Opportunities for learners to do exercises after something had been read are mainly in the form of answering questions in a workbook or on a worksheet were reported by 59.5% (SE=1.0%) as every day or almost every day. Writing something in response to what was read (41.3%, SE=1.0%), answering questions orally about what was read (47.7%, SE=1.1%) and talking with fellow learners about what was read (47.2%, SE=1.0%) occur slightly less frequently on a daily basis in comparison to answering questions in a workbook.

Table 6.4 indicates the frequency of opportunities reported by Grade 5 learners to do reading homework assigned by their teachers for any subject:

Table 6.4: Opportunities to do Reading Homework for Any Subject

Frequency of Reading Homework	N	% of Learners	SE %
I never have reading to do for homework	2 526	22.1	1.0
Less than once a week	1 280	11.9	0.5
1 or 2 times a week	2 416	21.3	0.8
3 or 4 times a week	1 876	15.9	0.6
Everyday	3 370	28.7	0.9

Alarmingly, as many as 22.1% (SE=1.0%) of Grade 5 learners never receive reading for homework and are therefore not afforded many opportunities to practice their skills in reading, specifically reading for understanding. The lack of reading homework being assigned to Grade 5 learners could be assuaged by as many as 65.3% (SE=1.6%) of learners who report taking out books from the library. Whether these opportunities indeed exist remains doubtful, since responses may reflect learners' wishes to take out books from the library rather than actual behaviour. However, when investigating the effect of taking out library books on reading achievement scores, it becomes apparent that for

learners who reportedly take out books, achievement is substantially higher (326.1, SE=7.7) than for those who reportedly do not do so (285.3, SE=6.5).

Mullis, Kennedy, Martin and Sainsbury (2004) state that the home is the most influential system in providing initial and important foundational exposure to, and opportunities for, language and literacy related activities. Parents of 48.7% (SE= 0.9%) of Grade 5 learners reported high engagement (measured in terms of every day or almost every day) with their children in the following early home literacy activities:

- Reading books
- Telling stories
- Singing songs
- Playing with alphabet toys
- Playing word games
- Reading aloud signs and labels

The reported high frequency of home literacy activities is related to a higher overall achievement in the PIRLS 2006 assessment for these learners at Grade 5 (325.5, SE=8.0), in comparison to the average achievement of their peers whose parents reported infrequent engagement in early literacy activities during the child's preschool years (276.9, SE=5.3).

Linked to the opportunities parents use to engage their children in early home literacy activities are those they create to engage their children in reading activities in general. These activities include situations when either parent:

- listens to the child read
- talks to the child about things that were done
- engages the child in what he or she is busy reading
- finds the opportunity to discuss the child's classroom reading with him or her
- accompanies the child to the library or a bookshop
- helps the child with reading for school

- encourages the child to read and write
- sings songs with the child
- talks to the child about what they are busy reading

Table 6.5 presents percentages of general reading activities in which the majority of parents engage their children on a daily basis:

Table 6.5: Percentage of Parents Reporting Daily Reading Activities with Children

Parents' Daily Activities with Children	N	% of Parents	SE %
Listen to the child read aloud	6 138	49.4	0.7
Talk about what was done	6 045	51.6	0.6
Talk with the child about what he or she is reading	5 706	46.6	0.8
Help the child with reading for school	6 857	55.4	0.7
Encourage the child to read	8 699	72.2	0.7
Discuss child's classroom reading with him or her	6 267	52.5	0.8

Despite parents' reports of daily engagement in activities listed in Table 6.5, the majority of Grade 5 learners' parents report never taking their children to libraries or bookshops (40.0%, SE=0.8%). Opportunities used to sing songs to the child and to talk to him or her about what they as parents are reading are split in frequency as every day and once weekly occurrences.

The opportunities parents use to read for their own enjoyment reveal that about 48.0% (SE=0.7%) of parents of Grade 5 learners read most frequently every day or almost every day. By role modelling frequent reading behaviour and creating opportunities to read for enjoyment, parents appear to increase the reading achievement scores their children obtained in the PIRLS 2006 assessment substantially – children of parents who reported reading every day achieved an average (321.8, SE=7.5) which is higher than that of children

whose parents reportedly only read for enjoyment once or twice a month (272.4, SE=6.5) and never or almost never (282.9, SE=9.4).

6.4.3. Motivation

Motivation to read at learner-level is closely linked to reading attitudes learners have towards reading. The types of literacy activities in which learners engage at home and at school may encourage and reinforce positive reading attitudes. The establishment of positive feelings and attitudes that learners should develop for reading is included as an educational outcome in most reading curricula. Reading broadens learners' knowledge, comprehension skills and experiences of different types of literature, and learners who enjoy reading are much more likely to engage more frequently in reading-related activities (Howie et al., 2009).

Learners responded to a number of questions in the Learner Questionnaire designed to ascertain their attitudes towards reading and their motivation to read. Based on these responses, an index with three categories was devised (high, medium and low)[6] to provide indications of learners' thoughts and feelings regarding themselves as readers. Internationally, learners generally regarded themselves as good to moderately good readers. South African learners also exhibit this pattern. The majority of Grade 5 learners indicated high (meaning positive) to medium reading self-concepts. Only a very small percentage of learners reported having a low reading self-concept. Learners reporting generally high reading self-concepts on average achieved substantially higher scores in the PIRLS 2006 reading assessment. Conversely, learners who responded negatively to statements of reading self-concept on average achieved much lower scores than their high and medium ranking counterparts.

[6] Average is computed on a 4-point scale: Disagree a lot=1, Disagree a little=2, Agree a little=3, Agree a lot=4. Responses for negative statements were reverse coded. High level indicates an average of greater than 3 to 4. Medium level indicates an average of 2 to 3. Low average indicates an average of 1 to less than 2 (Mullis et al., 2007).

Howie et al. (2007) caution that while it is potentially reassuring that a majority of South African Grade 5 learners have positive reading self-concepts, and many learners report reading for fun, one also has to view these positive outcomes with an element of skepticism. The data seem to suggest that a level of social desirability beyond plain fact is present in the responses, an argument supported by the fact that so many learners do not have access to books and many experience reading problems that would likely impede self-concept. These self-reported data should therefore be treated with caution.

Table 6.6 indicates frequencies of high, medium and low attitudes towards reading and illustrates that learners with high attitudes achieved substantially more than those learners with low reading attitudes. Similar patterns are found for learners with a high reading self-concept compared to those who do not regard themselves as good readers.

Table 6.6: Learners' Reading Attitudes and Reading Self-Concepts on Reading Achievement Scores

Learners' Reading Attitudes	**N**	**Reading Achievement**	**SE**
High	4 611	355.5	7.6
Medium	8 149	277.2	4.7
Low	547	323.6	13.0
Learners' Reading Self-Concept	**N**	**Reading Achievement**	**SE %**
High	4 101	369.5	6.6
Medium	8 589	282.1	5.2
Low	606	231.8	6.6

Parents impart their own beliefs about reading to their children, and these beliefs in turn shape how children are exposed to and experience a text (Mullis et al., 2006). Parents responded to beliefs about their own reading in the PIRLS 2006 Parent Questionnaire, and 36.5% (1.1%) of learners whose parents held reading in high regard, achieved on average 82 points higher than their

counterparts whose parents reported having medium-to-low attitudes towards reading.

Parents' beliefs about reading were related to the amount of time they reported spending on reading activities at home, for categories less than one hour per week, between one and five hours per week, and up to and including more than five hours per week. According to Howie et al. (2009), internationally 37% (SE=0.2%) of learners had parents who reported reading for more than five hours per week. This international percentage is slightly higher than national reports reflecting that 19.2% (SE=0.6%) of South African Grade 5 learners' parents reportedly read in excess of five hours every week.

6.4.4. Social Background

A well-known factor that influences reading achievement is the number of books available in the home. Although it seems that learners with more than 500 books in the home perform better than those without any books at home, the marginal effect of this indicator seems to fade out at more than 250 books.

Indicators of home resources point to Grade 5 learners who have their own study desks at home achieving higher (333.6, SE=7.2) than learners without one (274.0, SE=4.6). Learners in possession of a personal computer at home also achieved more (343.7, 9.2) than those who do not have one (279.0, SE=4.2). Grade 5 learners who reported to have between 26 and 100 books in the home achieved on average the highest (379.5, SE=10.6) when compared to learners who have fewer than 10 books in the home (282.7, SE=4.6), or those with more than 100 books in the home (345.0, SE=17.2). Learners with between 100 and 200 and more than 200 books in the home still achieved more (359.2, SE=12.9) than learners with few or no books in the home.

Parental responses to the PIRLS 2006 Parent Questionnaire indicate that fewer than 50% of Grade 5 learners have access to more than 10 books at home. Table 6.7 (below) supports reading literacy research on the topic of books in the

home and illustrates the effect that the number of books available in the home has on reading achievement scores for Grade 5 learners:

Table 6.7: Books at Home and Associated Reading Achievement Scores

Number of Books at Home	N	Average Achievement Score	SE
0-10 books	5 855	276.8	4.0
11-25 books	3 384	294.4	4.6
26-100 books	1 671	362.4	11.4
101-200 books	553	375.3	15.7
More than 200 books	643	389.2	17.2

Table 6.8 illustrates the effect of the availability (or lack of availability) of home resources on reading achievement for Grade 5 children, through an index of some basic goods in the home derived from proxy indicators of socio-economic advantage (e.g. the availability of electricity, flush toilets, television, radio, motor car, own bicycle and credit cards). Reading achievement is substantially higher for those children in the high category of the index, indicating better achievement when basic amenities and resources are available at home.

Table 6.8: The Effect of the Availability of Home Resources on Reading Achievement Scores

Home Resource Index	N	Reading Achievement	SE
High	237	527.8	15.0
Medium	7 717	324.0	6.2
Low	2 654	264.1	4.6

Parents of Grade 5 learners are largely unqualified, with the majority either having undergone no schooling or having left school at or before Grade 9 (or Standard 7). Table 6.9 provides a breakdown of Grade 5 learners' parents' qualifications:

Table 6.9: Grade 5 Learner Achievement by Parental Qualifications

	Father's Highest Qualification		Reading Achieve-ment	Mother's Highest Qualification		Reading Achievement
	N	%		N	%	
Did not go to school	2 275	32.1	265.0	2 225	28.5	269.2
Some primary school, lower than Grade 7	998	13.5	289.6	1 211	16.1	287.7
Grade 9/Std 7	2 284	30.6	333.1	2 573	32.5	337.9
Post secondary training (e.g. vocational training)	502	7.0	390.4	420	5.6	399.6
First degree/Diploma	566	8.6	470.1	683	10.8	459.0
Beyond first degree/Diploma	277	4.9	496.4	207	3.4	463.8
Not applicable	255	3.3	299.7	231	3.0	301.0

As indicated by Table 6.9, a higher percentage of fathers than mothers obtained education beyond their first degree or diploma. The level of qualification of Grade 5 learners' parents can be linked to the learners' reading achievement. Learners whose fathers had postgraduate qualifications achieved on average a score 470.1 points (SE=15.2), while learners with mothers who had postgraduate qualifications achieved on average 459.0 (SE=15.5). These achievement scores were the highest amongst the possible categories for parents' levels of qualification.

6.4.5. Language Skills

The PIRLS 2006 assessment was completed by 7 474 girls and 7 089 boys, with the largest percentage of Grade 5 learners using English (23.3%), followed by isiZulu (20.1%). Much smaller percentages used languages such as isiNdebele (0.6%), SiSwati (2.53%), Tshivenda (2.2%) and Xitsonga (3.2%). Languages were represented proportionally to the size of the subsets of the

general population speaking that language, by virtue of the random selection method. Table 6.10 (below) indicates the percentages of learners for the languages in which the PIRLS 2006 test was administered.

Table 6.10: Percentage per Language of the Test

Language	% of Learners
Afrikaans	9.9
English	23.2
IsiNdebele	0.56
IsiXhosa	18.0
IsiZulu	20.1
Sepedi	9.5
Sesotho	4.2
Setswana	6.4
SiSwati	2.5
Tshivenda	2.2
Xitsonga	3.1

The language of the PIRLS 2006 assessment coincided with the LOLT in Foundation Phase. Table 6.11 reports the average achievement for the sub-groupings of Grade 5 learners who reportedly always, sometimes or never speak the language of the test at home:

Table 6.11: Average Reading Achievement and Frequency of Test Language at Home

	N	% of Grade 5 Learners	Reading Mean Score Achievement	SE
Learners **always** speak the language of the test at home	6 575	62.1	305.6	6.6
Learners **sometimes** speak the language of the test at home	3 424	30.0	359.1	8.0
Learners **never** speak the language of the test at home	1 053	7.8	270.4	8.1

Although the percentage of learners who never speak the language of the test at home was relatively small (7.8%), this group had on average a much lower achievement (270.4, SE=8.1) when compared to learners who were more frequently exposed to the language of the test at home.

The smallness of the percentage of Grade 5 learners who report never to speak the language of the test at home is supported by parental reports on language use at home when engaging their children in reading literacy activities. The majority of Grade 5 learners' parents reported that they use the language of their child's PIRLS 2006 test when doing reading-related activities with their children at home (80.2%, SE=1.0%). While this high percentage may indicate a strong correspondence between home language and the language of the PIRLS 2006 test, it may also confirm that Grade 5 children, although being taught in English, still have exposure to their native languages at home. Only 19.8% (1.0%) of parents reported using another language at home when engaging their children in reading activities, of whom only a minor subset may be children of immigrant families who do not speak any of the eleven official languages at home.

6.5. SCHOOL-LEVEL EXPLANATORY VARIABLES

The second level of analysis of this study pertains to variables at the school and classroom-level. The PIRLS 2006 sample was drawn so that single intact classrooms within schools were selected, thereby making classrooms inextricably part of the school and rendering it impossible to separate classroom-level from school-level variables in this study. School principals and teachers of Grade 5 learners were requested to complete School and Teacher Questionnaires as part of their participation in the PIRLS 2006 study. This section will focus on those variables that have been selected from the School and Teacher Questionnaire and that are related to the conceptual framework as outlined in Chapter 4. Variables related to principal and teacher reports on school organizational quality, educational quality, time on task and opportunities used in the teaching of reading will be discussed.

6.5.1. Organizational Quality

At the school-level, organizational quality refers to the extent to which a school can be characterized by organizational features to enhance the effective functioning of the school. Organizational quality includes the number of days per week schools are open for teaching, and reported time spent by principals on school-related tasks, routines and activities.

A total of 397 school principals completed the PIRLS 2006 School Questionnaire, designed to gather information on school demographics, the school environment and resources, governance and organization of the educational system, curriculum characteristics and policies, the home-school connection, teacher training and preparation, and instructional activities and strategies employed mostly by Grade 5 teachers in the school.

Principals were asked to estimate the amount of time they spent on school-organizational activities, such as developing curriculum and pedagogy, managing staff, administrative duties, parent and community relations, teaching and interacting with individual learners. Table 6.12 reports the average

estimates provided by Grade 5 learners' principals for time spent on organizational activities in the school.

Table 6.12: Principal Estimates of Percentage of Time Spent on School Organizational Activities

Activities	N	% of Time Spent	SE %
Developing curriculum and pedagogy	310	15.5	0.6
Managing staff	310	17.2	0.6
Administrative duties	310	20.9	0.8
Parent and community relations	310	11.1	0.5
Teaching	310	21.8	1.6
Interacting with learners	310	8.8	0.5
Other activities	310	5.0	0.6

Principals reported that they spend approximately 23.7 hours (SE=1.7) per week on the listed activities. Most time is reportedly spent on administrative duties and managing staff, while time spent on parent and community relations and interactions with individual learners is more limited.

6.5.2. Educational Quality

Educational quality refers specifically to those activities undertaken by teachers in the classroom to teach, promote and engage learners in reading. Educational quality builds on the child's knowledge that was gained at home before entering the formal schooling system and should ensure a continuous, stimulating environment in which the learner can adapt, learn and develop an increasing repertoire of reading skills and abilities.

The effect of the home on developing early literacy skills is of importance and a lack of stimulating, pre-literacy activities at home might be a contributory factor towards children entering school with no basic knowledge of words, letters or sentences.

Overwhelmingly, Grade 5 school principal reports indicate that in the teaching of language and literacy skills, reading (63.9%, SE=2.4%), writing (54.7%, SE=3.0%) and speaking or listening (61.8%, SE=2.7%) receive more emphasis compared to other areas of the curriculum (e.g. mathematics, life skills).

Table 6.13 provides information on principal responses when asked about the percentage of children who are able to perform early literacy skills upon entry in Grade 1. In terms of all the listed early literacy skills, some 50% and more principals reported that fewer than 25% of the children in their schools are able to perform basic literacy activities when entering the school for the commencement of Grade 1. Only small percentages of principals, ranging between 4.1% and 8.3%, reported that more than 70% of children are able to perform early literacy skills.

Table 6.13: Principal Reports of Children Able to Perform Early Literacy Skills at Grade 1

Early Literacy Skills	N	Less than 25% of children	N	Between 25% and 50% of children	N	Between 51% and 70% of children	N	More than 70% of children
Recognize some words of the alphabet	180	43.7%	111	32.6%	77	15.4%	42	8.3%
Read some words	231	57.1%	96	26.7%	43	8.7%	24	7.5%
Read sentences	298	73.6%	56	15.7%	22	6.6%	13	4.1%
Write letters	216	53.1%	87	25.1%	60	15.1%	27	6.6%
Write some words	272	64.9%	66	20.7%	34	9.4%	20	5.0%

School principals were asked to report the approximate grades at which a particular set of reading skills and strategies first receive major emphasis. Figure 6.5 (below) illustrates the relative frequency of the introduction of skills to each grade:

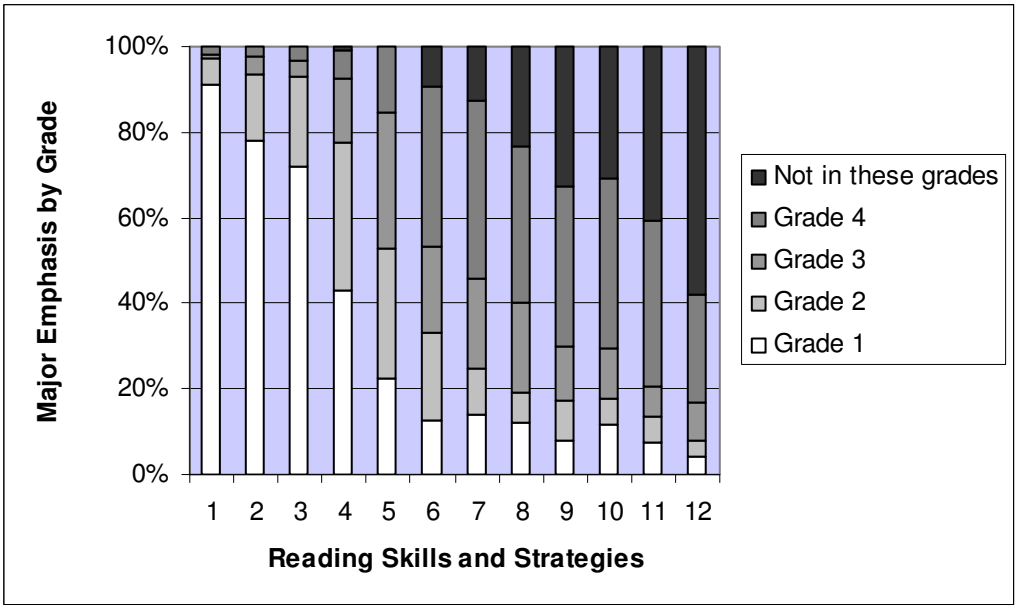


Figure 6.5: Grades by which Reading Skills and Strategies Receive First Major Emphasis

Knowing letters (1), *knowing letter-sound relationships* (2) and *reading words* (3) receive major emphasis in Grade 1. *Reading isolated sentences* (4) is introduced in 34.8% (SE=3.6%) of schools by Grade 2, while *reading connected text* (5) also receives major emphasis in Grade 2 when introduced by 30.5% (SE= 3.2%) of schools. *Identifying the main idea of text* (6), *explaining or supporting understanding of text* (7), *comparing text with personal experience* (8), *comparing different texts* (9) and *making predictions about what will happen next* (10) are for the majority of schools only introduced by Grade 4. The most complex strategies, namely *making generalizations and inferences* (11) and *describing the style and structure of the text* (12) are reported as not taught in any of grades 1 to 4, by more than 40% and 60% of principals respectively.

Of concern with the introduction of these different reading skills and strategies is the fact that many of the complex skills and strategies are introduced at a very late stage, often not even receiving attention during the Foundation Phase. The PIRLS 2006 processes of comprehension include complex reading strategies, similar to those listed in Figure 6.6 (below) that are incorporated into the reading assessment (e.g. *interpret and integrate ideas and information, evaluate and examine textual elements*). The complex reading skills and strategies seem only to begin to receive attention after the beginning of Grade 4 for most South

African learners. With the late introduction of these reading skills and strategies, the learners already are at a disadvantage in terms of performing appropriately with their international counterparts.

Figure 6.6 illustrates the effect of early emphasis of more complex reading skills and strategies on learners' average reading achievement. The pattern within the analysis suggests that learner achievement was higher in 6 of the 7 skills for those learners for whom a skill was introduced in Grade 1 compared to its introduction in subsequent grades. While it could be justified that the introduction of such a complex skill is not appropriate at Grade 1 level, learners for whom the seventh skill, *describing text style and structure,* was introduced in Grade 2, performed markedly better than learners for whom the skill was introduced in later grades.

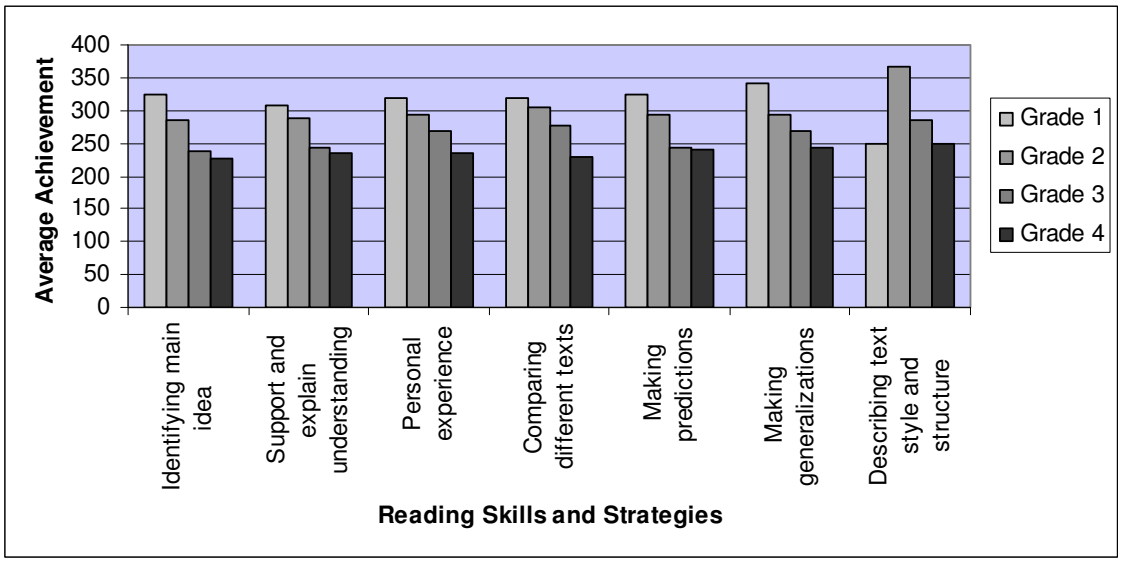


Figure 6.6: Average Achievement by Grades of Introduction of Complex Reading Skills and Strategies

Principals reported on the extent to which their capacity to facilitate teaching and learning was hampered by a shortage of resources such as qualified staff, instructional materials, physical resources as well as computers and computer software. On average, 23% (SE=2.5%) of South African learners were in schools where teaching and learning was hampered by a shortage of resources. Achievement by these learners was also lower (257, SE=9.1) than that in schools that were more adequately resourced (350, SE=16.0). This

difference is some 90 points higher in contrast to the average 29 point difference internationally.

According to approximately half of the school principals' responses, specific resource deficits that negatively affect the capacity of the school are:

- Insufficient provision of second language teachers
- Lack of instructional material
- Shortage of buildings and school grounds
- Shortage of instructional space
- Lack of computers for instructional purposes
- Lack of computer software
- Shortage of library books

The shortage of library books is affirmed by further principal reports which indicate that the majority of schools (64.4%, SE=3.4%) in the PIRLS 2006 sample do not have libraries. Only 141 of 265 school principals reported having libraries at their schools. For those schools with libraries, 24.9% (SE=4.2%) have 250 or fewer books of different titles, excluding magazines and periodicals, followed by 23.7% (SE=4.9%) which have between 250 and 500 books. Very few schools in the sample have more than 10 000 books in their libraries (4.3%, SE=1.5%).

Responses from Grade 5 learners' teachers in the Teacher Questionnaire indicate that the average Grade 5 class size included in the South African PIRLS 2006 study was 42.0 (SE=0.8) learners, which was the largest average class size of the participating countries, and far higher than the international average class size of 24 learners. Teachers' responses indicate that the majority of Grade 5 teachers do not provide enrichment reading instruction to their learners (76.3%, SE=2.8%). Table 6.14 reports average reading achievement scores for Grade 5 learners who receive enrichment reading instruction compared to those learners who do not:

Table 6.14: Reading Achievement Scores with Availability of Enrichment Reading Instruction

	N	Reading Achievement	SE
Grade 5 learners receiving enrichment reading instruction	3 227	316.1	15.3
Grade 5 learners without enrichment reading instruction	10 282	299.0	7.1

When comparing the average reading scores for these two groups, the difference in reading achievement for those learners who receive enrichment reading instruction is higher compared to those who do not, yet not statistically significant (p=0.018).

In terms of the availability of a reading corner in the classroom, teachers' responses indicate that 59.9% (SE=2.4%) of Grade 5 learners' teachers do not have a reading corner in the classroom. An overwhelming majority of teachers (46.8%, SE=2.9%) assign reading homework as part of any subject at least once or twice week. A total of 5.0% (SE=1.0%) of Grade 5 learners' teachers reportedly do not assign reading homework at all.

In assuring quality instruction, the majority of Grade 5 learners' teachers indicated the following methods of intervention when learners fall behind in reading (Table 6.15):

Table 6.15: Teacher Methods of Intervention for Learners Behind in Reading

Method of Intervention	N	% of Teachers	SE %
Spend more time working with the learner individually	12 236[7]	89.8	1.6
Arrange for other learners to help the struggling learner	12 060	86.4	2.0
Assign homework for the learner to catch up	12 669	91.3	1.4
Ask the parents to help the learner	13 513	97.1	0.8

In terms of monitoring learners' progress, teacher reports indicate that teachers of Grade 5 learners place major emphasis on classroom assessments (57.1%, SE=3.1%) and their own professional judgment (60.8%, SE=3.4%). Teachers place very little emphasis on national achievement tests (12.4%, SE=2.1%) to monitor learner performance. When asked what teachers are likely to do with assessment results, the majority of Grade 5 learners' teachers report that they use these results to assign marks or grades (94.4%, SE=1.5%), adapt their instruction (84.7%, SE=2.0%), inform parents of the learner's progress (96.5%, SE=1.1%), identify learners who are in need of remedial instruction (95.6%, SE=1.1%) and group learners for instruction (84.9%, SE=1.7%). Some 49.6% (SE=3.4%) of teachers report that they do not use assessment results to provide data for national or local monitoring.

Teachers of Grade 5 learners indicated that they use assessment results for purposes of identifying learners in need of remedial instruction (95.6%, SE=1.1%). Teachers also estimated that on average 10.4 (SE=0.7) learners per class are actually in need of remedial reading instruction. However, teacher reports estimate on average that only 6.5 (SE=0.6) learners actually receive remedial reading instruction. The data from the PIRLS 2006 study would therefore suggest that the demand for remedial reading instruction far exceeds

[7] In Table 6.15, N refers to the number of learners whose teachers report different methods of intervention.

teachers' abilities to supply the demand, and that many South African Grade 5 learners are in dire need of additional reading assistance.

6.5.3. Time on Task

School principals were asked to estimate the number of instructional days that their school was open for teaching and learning. The majority of Grade 5 learners' principals (30.0%, SE=2.6%) indicated that their schools were open for 195 days of the year. When broken down into instructional time that is available to learners in a typical school day, the majority of Grade 5 learners' school principals (58.6%, SE=2.9%) reported schools to be open for instruction at least five hours per day, with 22.1% (SE=2.5%) of principals reporting schools as open for instruction at least 6 hours per day.

The physical time in terms of days per year and hours per week that schools are open for instruction should not be equated with the type and quality of education learners receive. However, the times should at least provide an objective gauge of the availability and the number of opportunities learners are afforded to interact with teachers and peers in an educational setting away from the home.

Grade 5 teacher reports reveal that they spend most of their time teaching the class as a whole (47.9%, SE=1.1%), followed by time spent working with individual learners (22.5%, SE 0.9%). Time spent on administrative duties (10.3%, SE=0.4%), on managing discipline (10.9%, SE=0.5%) and on other duties (8.5%, SE=0.4%) takes up less of teachers' time at school.

In Grade 4, South African learners switch to English as the LOLT. Grade 5 teachers reportedly spend on average 5.11 hours (SE=0.2) in a typical week on English language teaching exclusively. This time includes time spent on activities such as reading, writing, speaking, literature and teaching other language skills.

The PIRLS 2006 international report indicates that on average teachers allocate 30% of instructional time to teaching language and 20% to teaching reading (Mullis et al., 2007). On average, international Grade 4 learners are taught explicit reading instruction for more than 6 hours a week. Grade 5 teachers' reports in the South African study reveal that teachers only spend on average 3.0 hours (SE=0.2) on teaching reading per week, regardless of whether or not this time is formally scheduled time or made available in the curriculum. On average, explicit reading time only amounts to 1.3 hours (SE=0.03) per week. Compared to international patterns of time spent on reading instruction and reading related activities, South Africa lags far behind on dedicated time and teachers spend far too little time on explicit reading instruction in the classroom.

Teacher expectations of the time learners should spend on homework that involves reading for any subject reveal that the majority of Grade 5 learners' teachers (54.3%, SE=3.1%) expect learners to spend between 16 and 30 minutes per day on such reading homework. Only 10.5% (SE=1.7%) of Grade 5 learners' teachers expect them to spend at least an hour per day engaging in some form of reading for homework. Teachers of Grade 5 learners' own preferences for reading for enjoyment show that 65.9% (SE=2.8%) of teachers read every day or almost every day, or at least once or twice a week (28.0%, SE=2.3%). A very small percentage reportedly never read for their own enjoyment (0.2%, SE=0.01%).

6.5.4. Opportunities Used

Opportunities afforded to Grade 5 learners to engage in reading at school, variables related to the existence of informal initiatives, the use of materials in school and the involvement of parents in school activities were taken from the PIRLS 2006 School Questionnaire to exhibit the opportunities used by learners to read.

According to Howie et al. (2007), roughly one-third of learners in the PIRLS 2006 sample attended schools that have a written statement of the reading curriculum to be taught. Two-thirds of learners attend schools that report having

informal initiatives to encourage reading at their schools. Anecdotal evidence of such initiatives includes reading competitions where learners stand to win prizes for most books individually read or read as a class. About 50% of learners attend schools which have school-based programmes and guidelines for teachers on the teaching of reading. Table 6.16 indicates Grade 5 reading achievement averages associated with availability of a written reading curriculum document and informal reading initiatives.

Table 6.16: Average Reading Achievement Associated with Reading Curricula Documents and Informal Reading Initiatives

	N	Average Reading Achievement	SE
The school has a written reading curriculum document	5 071[8]	311.6	10.4
The school does not have a written reading curriculum document	9 037	295.6	8.4
Informal reading initiatives exist	9 573	332.0	7.1
Informal reading initiatives do not exist	4 622	256.6	9.3

The opportunities for learners to read are influenced by the availability and use of different reading materials by the school. Table 6.17 indicates that up to half of Grade 5 learners' teachers reported the use of reading series (49.7%, SE=3.1%) and textbooks (52.8%, SE=3.2%) as the basis of material used for teaching purposes. A variety of children's books (43.1%, SE=2.6%), materials from different curricular areas (39.2%, SE=2.9%) and children's newspapers and magazines (46.7%, SE=2.8%) are material only used as supplementary aides. Computer software is never used to assist children in reading to learn (75.9%, SE=2.2%).

[8] In Table 6.16, N refers to the number of learners whose principals report the availability of reading curricula documents and informal reading initiatives..

Table 6.17: Frequency of Use of Different Types of Reading Material

Type of Reading Material	N	% of Teachers	SE %	Reported Frequency of Use
Reading series	7 003[9]	49.7	3.1	Basis of instruction
Textbooks	8 220	52.8	3.2	Basis of instruction
Children's newspapers and magazines	6 334	43.1	2.6	As supplement
Materials from different curricular areas	5 647	39.2	2.9	As supplement
Computer software	10 886	75.9	2.2	Never used

Reports of opportunities that are created by school principals to interact with Grade 5 learners' parents accentuate the importance of the continued connection between the home and the school and communication and involvement of parents in school events, meetings and activities.

Table 6.18 indicates the effect of Grade 5 learners' principals who involve parents at school on these learners' reading achievement scores compared to principals who never involve parents in school-related activities:

[9] In Table 6.17, N refers to the number of learners whose teachers report the frequency of use of different types of reading material.

Table 6.18: Parental Involvement Associations with Reading Achievement Scores

Activities	N	Reading Achievement	SE
Parent-teacher conferences 4-7 times annually	4 839[10]	319.6	12.6
Parent-teacher conferences once annually	1 778	259.1	10.0
Invitations to general events at school (7 times or more annually)	1 943	380.3	26.4
No invitations to general events at school	284	237.0	20.0
Report cards sent home seven or more times annually	422	383.5	60.3
Report cards never sent home	53	266.5	8.5

As indicated by Table 6.18, learners whose principals reported sending report cards home seven or more times a year achieved (383.5, SE=60.3) on average nearly 120 points more than Grade 5 learners from those schools where report cards were never sent home (266.5, SE=8.5).

The importance of the home-school connection and opportunities that are created by schools for parental participation is illustrated by the PIRLS 2006 data for the South African Grade 5 learners. Future cycles of PIRLS, educational achievement of learners of all ages, and strategic intervention are influenced by the growing incidence of HIV/AIDS amongst people in South Africa, not only affecting families, but also schools' capacity to provide healthy, productive teaching staff. The prevalence of child-headed households is on the increase in South Africa, as is the incidence of children living with grandparents or other caretakers. It is therefore expected that the home-school connection, specifically with regards to the involvement of parents and primary caregivers of

[10] In Table 6.18, N refers to the number of learners whose principals report parental involvement associated with achievement scores.

children, is likely to deteriorate if the current effects of HIV/AIDS were to escalate further.

Another factor that impedes the home-school connection is the role of poverty in preventing parents from attending school functions, even when invited. Anecdotally, it has been noted that school principals in rural areas specifically often have trouble in attracting parents to school for parents' fears of being asked to pay school fees which they cannot afford. Often the school's best intentions and efforts to involve parents in their children's education are met with suspicion and refusal to participate in school functions.

Opportunities for reading instruction and reading related activities created by Grade 5 learners' teachers reveal that a moderate percentage of teachers (39.1%, SE=3.3%) engage their learners in reading activities three or four days a week. Of concern is the 30.8% (SE=2.8%) of Grade 5 learners' teachers who reportedly afford their learners fewer than three occasions weekly to engage in reading activities.

Apart from the opportunities to read, teachers also reported on the resources they use when creating these opportunities for their learners. As many as 53% (SE=3.7%) of Grade 5 learners' teachers reported using textbooks every day or almost every day. Curiously, the average achievement of learners whose teachers reported to never using textbooks was higher (371.0, SE=56.7) than that of their counterparts who reported daily use of textbooks (294.5, SE=7.9). Only 13.0% (SE=2.2%) of Grade 5 learners had teachers who reported using a variety of children's books for reading instruction every day or almost every day, while the majority of Grade 5 learners' teachers (87.6%, SE=2.1%) reportedly never use computer software for the teaching of reading. This high percentage is indicative of the number of classrooms in South African schools which have as yet no access to computers, software or the Internet.

The reliance on textbooks by a large percentage of teachers of Grade 5 learners must be seen within the context of teaching in many schools in South Africa. Not only are textbooks often the only source available to the teacher as

an aide to teaching reading, but the quality of these books is debatable. Anecdotal evidence gathered specifically during school visits in rural areas points to many outdated Afrikaans and English textbooks having been handed down to rural schools. In some cases, these books can be found unused on shelves, but alarmingly, there are schools where these outdated books are being put to use. In addition, teachers often rely on textbooks to the extent that learners are not afforded the opportunity to take these books home for fear of damage or loss. Thus, learners' only exposure to books is often in the form of textbooks, and then only for the limited time the learner is present in class.

Table 6.19 indicates the percentages of Grade 5 learners whose teachers create opportunities for them to read different types of texts every day or almost every day, and illustrates that most children are exposed to short stories, factual descriptions and charts, diagrams and graphs.

Table 6.19: Grade 5 Learners Exposure to Different Types of Text

Type of Text	N	% of Learners	SE %
Short stories	2 173	16.7	2.9
Longer books with chapters	438	4.6	1.5
Poems	326	3.6	1.3
Plays	545	3.5	1.2
Descriptions and explanations about things, people and events	2 255	18.6	2.6
Instructions or manuals about how things work	2 253	9.9	2.6
Charts, diagrams and graphs	2 588	20.2	2.5

South African children are mostly exposed to reading skills such as decoding strategies and understanding vocabulary during the Foundation Phase (Grades 1 to 3). According to Pretorius (2002), the Intermediate Phase (Grades 4 to 6) affords them the opportunity to use reading as a language and information processing skill, as they are largely expected to be able to decode text. At Grade 4, learners should also begin the switch from learning the lower level

skills in learning to read, to adapting those skills in order to use reading as a tool to learn.

Teachers of Grade 5 learners in PIRLS 2006 report in 21.6% (SE=2.5%) of cases to engaging learners daily in decoding strategies, compared to 69.0% (SE=0.5%) of teachers of Grade 4 learners internationally.

In terms of time allocated to reading activities in the classroom, more than half the Grade 5 learners (53.6%, SE=3.4%) had teachers who reported reading aloud to the whole class every day or almost every day. For these learners, this reading is the most frequent activity listed by teachers. Reading aloud to the class is a teacher-centred rather than learner-centred approach, where learners are only involved passively and where the teacher mainly assumes that learners are able to follow and understand what is being read. Also of concern are the low frequencies at which learners are afforded the opportunity to read independently.

Only 32.5% (SE=2.8%) of Grade 5 learners' teachers report that learners have the opportunity to read independently as little as once or twice a month. Given the lack of opportunity afforded to Grade 5 learners to read independently, it would be understandable if the format of the PIRLS 2006 reading assessment (consisting of reading booklets composed of reading passages for each child individually) had been an intimidating and foreign experience for many South African Grade 4 and Grade 5 learners. For the 20.7% (SE=2.5%) of Grade 5 learners who are afforded daily opportunities to read silently on their own, achievement scores were almost 100 points higher (371.1, SE=19.1) than for those who never read independently (298.4, SE=30.4).

Figure 6.7 indicates the percentage of Grade 5 learners' exposure to every day reading activities that are aimed to develop their reading comprehension skills and strategies:

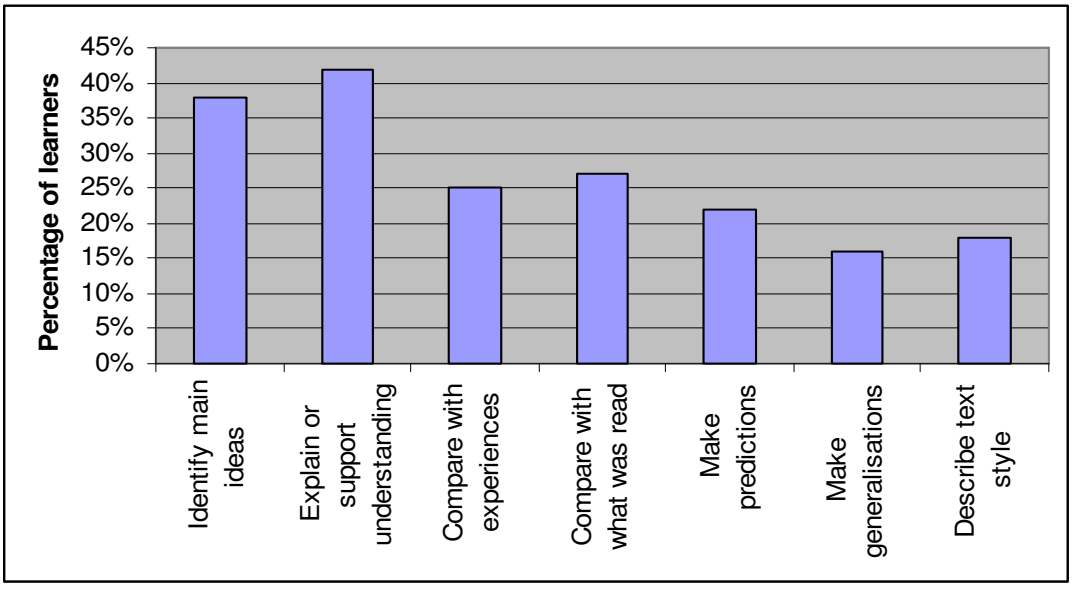


Figure 6.7: Percentages of Grade 5 Learners Exposed to Types of Reading Comprehension Activities

In the foregoing sections it has been mentioned that the time teachers spend with learners in the classroom on explicit reading instruction is far too constrained in comparison to international patterns of time spent on formal reading instruction. Figure 6.7 adds to the gloomy picture painted by teacher reports on reading activities in the class, since it illustrates that Grade 5 learners are mostly exposed to identifying main ideas and explaining their understanding of text. Higher order comprehension skills that should also receive attention (such as the ability to compare what was read with own experiences, making predictions, making generalizations and describing the text style) are activities with noticeably lower frequencies. The PIRLS 2006 assessment included in its assessment framework items of a higher order nature. With the limited opportunities for South African Grade 5 learners of exposure to such skills in the classroom on a daily basis, it is hardly surprising that Grade 5 reading achievement scores failed to meet international patterns of Grade 4 reading abilities.

CHAPTER 7: BUILDING LEARNER- AND SCHOOL-LEVEL MODELS WITH HLM

"You don't have to burn books to destroy a culture. Just get people to stop reading them"

Ray Bradbury

This research seeks to investigate the factors within the learners' background, for instance motivation to read, language skills and home environment that affect performance in reading literacy. It also seeks to uncover the extent to which factors associated with the school and classroom environments affect reading literacy performance. Also of importance is ascertaining how these relationships between factors differ or remain constant across the 11 official languages in South Africa, at least in light of the five language groupings.

For the purposes of answering these questions, Hierarchical Linear Modelling (HLM) was used. In Chapter 5 a detailed description was provided of HLM. The aim of using HLM is to establish the relationships between one or more explanatory variables obtained from items in the PIRLS 2006 contextual questionnaires on learner and school-level and the outcome variables in the form of reading achievement scores for the different language groupings.

The remainder of this chapter will examine the extent of variation between language groupings as basis for further analysis (section 7.1). Section 7.2 is dedicated to the learner-level model, outlining the factors associated with it as taken from the components of Creemers' Comprehensive Model of Educational Effectiveness and the corresponding variables as taken from the PIRLS 2006 learner and parent questionnaires. Similar descriptions of the school-level model, outlining the factors and their associated variables that were obtained from Grade 5 learners' teachers and school principals are presented in section 7.3. Explanations of how the scales for each factor were constructed and how HLM 6 was utilized in testing the two level model are presented throughout sections 7.2, 7.3 and 7.4.

7.1. VARIATION BETWEEN LANGUAGE GROUPINGS

Chapter 6 presented results of Grade 5 learners' performance on the PIRLS 2006 achievement tests (in reference to sub-question 1) for each of the 11 official languages. Table 7.1 (below) shows the average achievement scores per language:

Table 7.1: Average Grade 5 Achievement Score per Language

Language	N	% of PIRLS 2006 Sample	Average Achievement Score	SE
Afrikaans	1 678	11.5	415.7	12.0
English	2 793	19.1	398.0	17.1
IsiNdebele	798	5.5	238.6	12.2
IsiXhosa	1 470	10	215.0	7.6
IsiZulu	1 733	11.8	262.8	5.9
Sepedi	1 349	9.2	243.1	5.9
Sesotho	959	6.5	288.6	7.6
Setswana	1 055	7.2	288.1	12.1
Siswati	1 147	7.8	248.9	16.0
Tshivenda	784	5.3	262.1	15.0
Xitsonga	891	6.1	277.6	10.6

For the purposes of building multi-level models more effectively, it was decided not to analyze data individually for each of the 11 official languages. It has to be borne in mind that 11 official languages imply that analyses would have to be repeated and replicated 11 times over, with a chance that, due to small sample size, the languages spoken by less than 5% of the South African population (namely isiNdebele, Siswati, Tshivenda and Xitsonga) would be too small to permit pertinent specific insights from the analyses. To streamline this process, the PIRLS 2006 data was reduced and recoded into five language groupings, namely Afrikaans, English and Tshivenda as lone-standing language groupings,

followed by the Nguni languages (consisting of isiNdebele, isiXhosa, isiZulu, Siswati and Xitsonga), and the Sotho languages (consisting of Sepedi, Sesotho and Setswana). It will be noted that the Tshivenda sample of learners is very small. It might be argued that this language should be collapsed into one of the other language groupings, but because of its linguistic uniqueness, Tshivenda will be handled as a separate language grouping, in spite of its small sample size.

Average achievement scores for these language groupings are presented in Table 7.2:

Table 7.2: Average Grade 5 Achievement Score per Language Grouping

Language Grouping	N	% of the PIRLS 2006 Sample	Average Achievement Score	SE
Afrikaans	1 678	11.5	415.7	12.0
English	2 793	19.1	398.0	17.1
Nguni	6 039	41.2	243.3	4.4
Sotho	3 363	22.9	267.1	5.2
Tshivenda	784	5.3	262.1	15.0

The patterns of average achievement scores remain very similar between individual languages, and when grouped together into language groupings. Similar to the individual language analysis, Afrikaans and English Grade 5 learners outperformed learners from African languages, with a substantial drop in achievement for learners from Sotho, Tshivenda and then Nguni language groupings.

Due to the differences in average achievement scores between language groupings, the assumption is that variation will exist between different groupings of learners, in this case particularly based on language. Table 7.3 (below) indicates the variance between language groupings. Variance was computed using the Statistical Package for Social Sciences (SPSS) software.

Table 7.3: Variance Across Language Groupings

Language Grouping	N	Un-weighted Variance	Weighted Variance (Total Student Weight)
Afrikaans	1 678	16 052.2	17 027.5
English	2 793	21 925. 7	24 012.1
Nguni	6 039	8 813.2	9 386.4
Sotho	3 363	8 916.9	9 021.1
Tshivenda	784	9 761.4	9 291.6

Previous studies, for example Howie (2002), mirror the extreme variance and as here presented in Table 7.3, across language groupings. South African classrooms are characterized by large variation, rendering any generalizations difficult within such heterogeneous groups of learners. Intuitively, for example, one might be inclined to think that the group of Afrikaans Grade 5 learners should form a fairly homogenous group of white, Afrikaans first language speakers. However, it has to be kept in mind that the group of Afrikaans learners in this sample is also made up of learners who speak Afrikaans as a second language and may therefore include learners from Coloured and Black communities, who may be substantially less advantaged. This same pattern is of relevance to the other language groupings as well, where very little homogeneity exists within groups.

7.2. BUILDING THE LEARNER-LEVEL MODEL

Learner-level factors were identified from Creemers' Comprehensive Model of Educational Effectiveness and are expected to have an influence on reading literacy achievement. Factors that are associated with reading achievement on learner-level are time, opportunities used to read, motivation to read, social background and basic skills related to the ability to use language. For each of these factors, a number of variables have been identified and selected for analysis from the PIRLS 2006 learner and parent questionnaires.

It has to be kept in mind that not all of the variables from the contextual questionnaires will be used in building the learner-level model. Rather, only variables have been selected in accordance with the factors as outlined by Creemers, so in this way, a theoretical point of departure serves as justification for including and excluding some available variables in the model. By aggregating many or all the variables from the questionnaires, one allows the data and its artifacts to guide the analyses, instead of grounding the analyses in a firm theoretical underpinning. Raudenbush and Bryk (2002) also warn against an approach that includes all available variables in the model and then only deletes those variables of apparently little significance in the initial analyses. In taking this shotgun approach, the variation can be partitioned into many small segments, none of which might appear to have statistical significance.

The limitations of choosing only a theoretical model as a source for choosing variables for inclusion in the analyses may be a risk. Relevant sources of variation may not be represented in the model and might be overlooked. Despite this risk, a theoretical route was taken to investigate how variables that were operationalised in the data could be combined in clusters or factors. The decision to be made was then whether these clusters could be interpreted in terms of the concepts from Creemers' model or whether new concepts would be provided that were not yet represented in the chosen model. In this way, evidence was sought and established for the validity and adequacy of Creemers' model as bearing the closest conceptual resemblance for this study's research problem.

7.2.1. Variables Included in the Learner-level Model

Items in the PIRLS 2006 Learner and Parent questionnaires took the form of Likert scale questions, with each question stem followed by a number of options or statements to be responded to. Table 7.4 provides the factors as taken from Creemers' model, and the corresponding variables (as taken from the PIRLS 2006 Learner and Parent questionnaires) that are related to each of Creemers'

model. A description of the variables that have been selected for building a learner-level model is also provided.

Table 7.4: Factors and Variables Included in the Learner-Level Model

Factor	Variable Name	Variable Description
Time	asbgtoc1-7	Frequency of reading related activities outside of school
	asbgrto1-10	Frequency of specific reading activities outside of school
	asbgtsp1-5	Time spent engaging in activities outside of school on a normal school day
	asbgrht	Time spent on reading homework
	asbhtsoh*[11]	Time spent on reading homework as reported by parents
	asbhread*	Parents' time spent on reading related activities
Opportunity Used	asbgthc1-6	Frequency of reading related activities in school
	asbgafr1-4	Types of reading activities learners are afforded after reading
	asbghwrd	Frequency of reading homework
	asbgboff	Opportunities to take out books from the library
	asbhha1-11*	Opportunities used by parents/caregivers to engage the child in pre literacy activities
	asbhdot1-10*	Opportunities used by parents/caregivers to engage the child in reading related activities
	asbhrre*	Opportunities parents use to read for their own enjoyment
Motivation	asbgrst1-6	Attitudes about reading
	asbgrd1-7	Self-perceptions of reading abilities
	asbhstm1-5*	Parents' attitudes towards reading
Basic Skills (Language)	asbglngh	Frequency of speaking the language of the test at home
	asbhactl*	Language parents engage child in when doing reading activities
Social Background	asbgbook	Number of books in the home
	asbgta1-17	Resources in the home e.g. running water, electricity, television
	asbhchbk*	Number of children's books in the home

[11] *Denotes variables taken from the PIRLS 2006 Parent Questionnaire. All other variables are taken from the PIRLS 2006 Learner Questionnaire.

	asbhledf*	The highest level of education completed by the child's father
	asbhledm*	The highest level of education completed by the child's mother

7.2.2. Constructing Learner-level Scales From the PIRLS 2006 Learner and Parent Questionnaire Items

Table 7.4 has indicated that a selected number of items from the PIRLS 2006 Learner and Parent questionnaires were chosen as possible predictors of reading outcomes at the learner-level in accordance with Creemers' Model of Educational Effectiveness.

In order for multi-level models to be built, the individual questionnaire items had to be re-constructed into scales that corresponded to the factors measured by Creemers. The first step in this process was to aggregate all variables with more than one response option (as selected form the PIRLS 2006 questionnaires) to create a single composite scale per Creemers factor.

Principal component factor analysis was performed for each cluster of variables within the data scales corresponding to Creemers' model. The components were un-rotated and in all cases, initial extraction resulted in the extraction of two components. Table 7.5 (below) shows the results of the factor analysis for scales constructed from the PIRLS 2006 Learner Questionnaire:

Table 7.5: Factor Extraction with Learner-Level Variables from the Learner Questionnaire

Factor as Measured by Creemers' Model	PIRLS 2006 Variable Name	Variable Description	New Variable Name	Component Score
Time	asbgtoc1-7	Frequency of reading related activities outside of school	Scaletoc	.128
	asbgrto1-10	Frequency of specific reading activities outside of school	Scalerto	.797
	asbgtsp1-5	Time spent engaging in activities outside of school on a normal school day	Scalegtsp	.200
	asbgrht	Time spent on reading homework	asbgrht	-.307
Opportunity Used	asbgthc1-6	Frequency of reading related activities in school	Scalethc	.045
	asbgafr1-4	Types of reading activities learners are afforded after reading	Scalegafr	.046
	asbghwrd	Frequency of reading homework	asbghwrd	-.032
	asbgboff	Opportunities to take out books from the library	asbgboff	.988
Motivation	asbgrst1-6	Attitudes about reading	Scalegrst	.894
	asbgrd1-7	Self-perceptions of reading abilities	Scalegrd	.878
Basic Skills (Language)	asbglngh	Frequency of speaking the language of the test at home	asbglngh	Removed from model
Social Background	asbgbook	Number of books in the home	asbgbook	.998
	asbgta1-17	Resources in the home e.g. running water, electricity, television	Scaleta	-.008

Table 7.6 (below) shows the results for the factor analysis on the learner-level variables taken from the PIRLS 2006 Parent Questionnaire:

Table 7.6: Factor Extraction with Parent-Level Variables from the Parent Questionnaire

Factor as Measured by Creemers' Model	PIRLS 2006 Variable Name	Variable Description	New Variable Name	Compo-nent Score
Time	asbhtsoh	Time spent on reading homework as reported by parents	asbhtsoh	.666
	asbhread	Parents' time spent on reading related activities	asbhread	.666
Opportunity Used	asbhha1-11	Opportunities used by parents/caregivers to engage the child in pre literacy activities	Scalehha	.483
	asbhdot1-10	Opportunities used by parents/caregivers to engage the child in reading related activities	Scaledot	.498
	asbhrre	Opportunities parents use to read for their own enjoyment	asbhrre	.355
Motivation	asbhstm1-5	Parents' attitudes towards reading	asbhstm1-5	Removed from model
Basic Skills (Language)	asbhactl	Language parents engage child in when doing reading activities	asbhactl	Removed from model
Social Background	asbhchbk	Number of children's books in the home	asbhchbk	.301
	asbhledf	The highest level of education completed by the child's father	asbhledf	.493
	asbhledm	The highest level of education completed by the child's mother	asbhledm	.494

Information contained in Table 7.5 and 7.6 (above) indicates new names for some variables, while recording the original variable names for others. Only composite scores (and new scale variables) need new names. Factors with only a single item have unchanged names in the new data set with fewer explanatory variables.

It should also be noted that component scores are not provided for Motivation in Table 7.6 or Basic Skills (Language) in both Tables 7.5 and 7.6. Items related to 'Motivation' were removed as indicators, because these items were found upon closer inspection rather than being indicative of parent motivation to read, are

more closely related to parental attitudes towards reading. No other suitable replacement items could be found for this motivational factor, a decision was made to remove it from the theoretical model for the data analysis

Basic Skills (Language) have no component scores for either table, because the single candidate item each case was found on closer inspection not to be indicative of basic skills of either learner or parent. This component was also removed from the theoretical model for data analysis.

The initial principal component factor analysis resulted in two components being extracted for each of the scales constructed to measure factors of Creemers' model. A number of negative component scores were also evident on a number of items. The composite scales and items with only one response option were saved as standardized z-scores. Standardized scores would allow for variance to be comparable across variables.

The procedure of conducting a principal component analysis was now repeated for each variable, but by making use of the standardized score and saving the factor score in the data-set. Tables 7.7 and 7.8 (below) provide details of components scores for the analyses at learner-level:

Table 7.7: Factor Extraction with Standardized Learner-Level Scores from the Learner Questionnaire

Factor as Measured by Creemers' Model	PIRLS 2006 Variable Name	Variable Description	New Variable Name	Compo-nent Score
Time	asbgtoc1-7	Frequency of reading related activities outside of school	ZScore (Scaletoc)	.711
	asbgrto1-10	Frequency of specific reading activities outside of school	ZScore (Scalerto)	.744
	asbgtsp1-5	Time spent engaging in activities outside of school on a normal school day	ZScore (Scalegtsp)	.867
	asbgrht	Time spent on reading homework	asbgrht	Removed from model
Opportunity Used	asbgthc1-6	Frequency of reading related activities in school	ZScore (Scalethc)	.881
	asbgafr1-4	Types of reading activities learners are afforded after reading	ZScore (Scalegafr)	.881
	asbghwrd	Frequency of reading homework	asbghwrd	Removed from model
	asbgboff	Opportunities to take out books from the library	asbgboff	Removed from model
Motivation	asbgrst1-6	Attitudes about reading	Scalegrst	Removed from model
	asbgrd1-7	Self-perceptions of reading abilities	Scalegrd	Removed from model
Basic Skills (Language)	asbglngh	Frequency of speaking the language of the test at home	asbglngh	Removed from model
Social Background	asbgbook	Number of books in the home	ZScore (asbgbook)	.639
	asbgta1-17	Resources in the home e.g. running water, electricity, television	ZScore (Scaleta)	.639

Variance was computed for each of the factors from Creemers' model separately. In Table 7.7 (above), the factor 'Time' accounts for 61.4% of the variance, while the factor 'Opportunity used' explains 77.6% of the variance in reading achievement at learner-level. The factor 'Social background', which is a composite of the quantum of books in the home and indicators of possessions, explain 61.2% of the variance.

Table 7.8 (below) indicates the standardized component extraction of learner-level variables taken from the Parent Questionnaire:

Table 7.8: Factor Extraction with Standardized Learner-Level Scores from the Parent Questionnaire

Factor as Measured by Creemers' Model	PIRLS 2006 Variable Name	Variable Description	New Variable Name	Component Score
Time	asbhtsoh	Time spent on reading homework as reported by parents	ZScore(asbhtsoh)	.751
	asbhread	Parents' time spent on reading related activities	ZScore(asbhread)	.751
Opportunity Used	asbhha1-11	Opportunities used by parents/caregivers to engage the child in pre literacy activities	ZScore(Scalehha)	.795
	asbhdot1-10	Opportunities used by parents/caregivers to engage the child in reading related activities	ZScore(Scaledot)	.820
	asbhrre	Opportunities parents use to read for their own enjoyment	ZScore(asbhrre)	.585
Motivation	asbhstm1-5	Parents' attitudes towards reading	asbhstm1-5	Removed from model
Basic Skills (Language)	asbhactl	Language parents engage child in when doing reading activities	asbhactl	Removed from model
Social Background	asbhchbk	Number of children's books in the home	ZScore(asbhchbk)	.522
	asbhledf	The highest level of education completed by the child's father	ZScore(asbhledf)	.853
	asbhledm	The highest level of education completed by the child's mother	ZScore(asbhledm)	.855

Similar to Table 7.7, variance was computed for each of the factors as measured by Creemers' model separately. In Table 7.8, the factor 'Time' accounts for 56.4% of the variance in reading achievement scores, while

'Opportunity used' explains 54.9% of variance. 'Social background', as measured by parents' level of education and availability of specifically children's books in the home accounts for 57.7% of variance.

7.3. BUILDING THE SCHOOL-LEVEL MODEL

For the purposes of this study, a two-level model is suggested, with learner-level variables nested within school-level variables. The PIRLS 2006 sample was drawn so that only single intact classrooms within schools were selected, thereby making them inextricably part of the school. Thus school and classroom-level variables are confounded together in one level, and variables at these levels cannot be separated from one another in the data.

7.3.1. Variables Included in the School-Level Model

The theoretical points of departure used as a framework for analysis and the procedures that guided the selection of variables for the school-level model are the same as those that were followed for the learner-level model. Table 7.9 illustrates the factors and PIRLS 2006 variables that have been selected for the school-level model in accordance with Creemers' model.

Table 7.9: Factors and Variables Included in the School-Level Model

Factor as Measured by Creemers' Model	PIRLS 2006 Variable Name	Variable Description
Educational Quality	acbgacu1-3	Emphasis school places on teaching specific language and literacy skills to learners in Grades 1-4
	acbgme1-12	Grade at which specific reading skills and strategies first receive major emphasis in instruction in the school
	acbgsi1-14	School's capacity to provide instruction affected by a shortage or inadequacy of specific issues
	atbgcstd*[12]	The number of learners in the class

[12] *Denotes variables taken from the PIRLS 2006 Teacher Questionnaire. All other variables are taken from the PIRLS 2006 School Questionnaire.

	atbgercn*	Provision for enrichment reading instruction
	atbglicr*	Availability of a library or reading corner in the classroom
	atbghwr1*	Frequency of assigning reading as part of homework (for any subject)
	atbgbhr1-8*	Teacher strategies if a learner begins to fall behind in reading
	atbgmsr 1-4*	Emphasis that is placed on specific sources to monitor learners' progress in reading
	atbgasp1-7*	Frequency of using specific tools to assess learners' performance in reading
Organizational Quality	acbgcoop	School's official policy statement related to promoting cooperation and collaboration among teachers
Time	acbgtac1-7	Percentage of principal's time that is devoted to specific activities
	acbgtach	The amount of hours per week spent on different activities
	acbgidy (ACBGZ003)	The amount of days per year the school is open for instruction
	atbgpac1-5*	Percentage of teachers' time per week in class with learners devoted to specific activities
	atbgacth*	The amount of time per week spent on English language instruction and/or activities with the learners
	atbgfrdh*	The amount of time that is explicitly for formal reading instruction
	atbghwr 2*	The amount of time learners are expected to spend on homework involving reading (for any subject)
	atbgrdjy*	Frequency of teacher reading for enjoyment
	acbgrii	Informal initiatives to encourage learners to read
	acbgma1-6	School's use of the specific materials in reading instructional programme for learners in Grades 1-4
Opportunity Used	acbgpro1-5 (ACBGZ049-053)	Frequency in providing specific services by the school for Grade 5 learners and/or their families
	atbgract*	Frequency teacher has reading instruction and/or reading activities with the learners
	atbgria1-9*	Frequency of using specific resources when doing reading activities/instruction

	atbgra1-10*	Frequency of doing specific activities when doing reading activities/instruction
	atbgdev1-7*	Frequency teacher requires of learners to engage in specific activities to help develop reading comprehension skills or strategies

7.3.2. Constructing School-Level Scales from the PIRLS 2006 School and Teacher Questionnaire Items

The procedures followed to construct scales for the learner-level variables were replicated to construct the school-level scales. Table 7.10 indicates the initial, un-rotated components that were extracted through principal factor analysis for the school-level variables as taken from the PIRLS 2006 School Questionnaire:

Table 7.10: Factor Extraction with School-Level Variables from the School Questionnaire

Factor as Measured by Creemers' Model	PIRLS 2006 Variable Name	Variable Description	New Variable Name	Compo-nent Score
Educational Quality	acbgacu1-3	Emphasis school places on teaching specific language and literacy skills to learners in Grades 1-4	Scalegacu	.648
	acbgme1-12	Grade at which specific reading skills and strategies first receive major emphasis in instruction in the school	Scaleme	.764
	acbgsi1-14	School's capacity to provide instruction affected by a shortage or inadequacy of specific issues	Scalegsi	-.006
Organizational Quality	acbgcoop	School's official policy statement related to promoting cooperation and collaboration among teachers	acbgcoop	Removed from model
Time	acbgtac1-7	Percentage of principal's time that is devoted to specific activities	Scaletac	.904
	acbgtach	The amount of hours per week spent on different activities	acbgtach	.313
	acbgidy (ACBGZ003)	The amount of days per year the school is open for instruction	acbgidy (ACBGZ003)	-.243
	acbgrii	Informal initiatives to encourage learners to read	acbgrii	-.153

Opportunity Used	acbgpro1-5 (ACBGZ049-053)	Frequency in providing specific services by the school for Grade 5 learners and/or their families 9-053)	ScaleZ49	.763
	acbgma1-6	School's use of the specific materials in reading instructional programme for learners in Grades 1-4	Scalema	.763

As noted, the variable selected for the factor 'Organizational Quality' was removed from the theoretical model before the principal component analysis was conducted. Upon closer inspection, the item selected to serve as an indicator of organizational quality seems rather to be a measure of teacher cooperation. In the absence of other supporting items that could be used as indicators of the factor 'organizational quality', the item and factor were removed from the model.

Table 7.11 indicates the initial extraction of components of school-level variables that were selected from the PIRLS 2006 Teacher Questionnaire:

Table 7.11: Factor Extraction with School-Level Variables from the Teacher Questionnaire

Factor as Measured by Creemers' Model	PIRLS 2006 Variable Name	Variable Description	New Variable Name	Compo-nent Score
Educational Quality	atbgcstd	The number of learners in the class	atbgcstd	.388
	atbgercn	Provision for enrichment reading instruction	atbgercn	.507
	atbglicr	Availability of a library or reading corner in the classroom	atbglicr	.566
	atbghwr1	Frequency of assigning reading as part of homework (for any subject)	atbghwr1	.103
	atbgbhr1-8	Teacher strategies if a learner begins to fall behind in reading	Scalebhr	.068
	atbgmsr 1-4	Emphasis that is placed on specific sources to monitor learners' progress in reading	Scalegmsr	.000
	atbgasp1-7	Frequency of using specific tools to assess learners' performance in reading	Scalegasp	-.186

Time	atbgpac1-5	Percentage of teachers' time per week in class with learners devoted to specific activities	Scalepac	-
	atbgacth	The amount of time per week spent on English language instruction and/or activities with the learners	atbgacth	-.012
	atbgfrdh	The amount of time that is explicitly for formal reading instruction	atbgfrdh	.170
	atbghwr 2	The amount of time learners are expected to spend on homework involving reading (for any subject)	atbghwr 2	.354
Opportunity Used	atbgrdjy	Frequency of teacher reading for enjoyment	atbgrdjy	-
	atbgract	Frequency teacher has reading instruction and/or reading activities with the learners	atbgract	.557
	atbgria1-9	Frequency of using specific resources when doing reading activities/instruction	Scalegria	.779
	atbgra1-10	Frequency of doing specific activities when doing reading activities/instruction	Scalegra	.842
	atbgdev1-7	Frequency teacher requires of learners to engage in specific activities to help develop reading comprehension skills or strategies	Scaledev	.814

The absence of component scores for two items can be seen in Table 7.11 (above). The variable named 'atbgpac' (the percentage of teachers' time per week in class with learners devoted to specific activities) was an item requesting teachers to indicate percentages of time spent on different classroom-related activities. The item was answered poorly and unreliably: though it instructed teachers to make the total reported time spent on activities as 100%, nonetheless many teachers did not comply with the instruction, resulting in unreliable responses often exceeding 100% in total.

The second variable for which a component score is absent ('atbgdjy' – the frequency of teacher reading for enjoyment) relates to teachers reports on time spent for their own enjoyment. Upon further reflection, the item is not regarded as a good indicator of reading outcomes at Grade 5, but rather, the item is regarded as a stronger indicator of teacher attitudes towards reading, so the decision was taken to remove it from the theoretical model for the data analysis.

The results of the initial factor extraction resulted in some negative component scores and the extraction of two components for each cluster of items that represent a factor as measured by Creemers' model. For this reason, the route followed with constructing the learner-level scales was replicated. School-level variables from PIRLS 2006 School and Teacher Questionnaires were saved as standardized scores, and factor scores to these were saved as new variables in the dataset. Table 7.12 shows the results of the principal component factor analysis with the standardized scores from the School Questionnaire items:

Table 7.12: Factor Extraction with Standardized School-Level Scores from the School Questionnaire

Factor as Measured by Creemers' Model	PIRLS 2006 Variable Name	Variable Description	New Variable Name	Component Score
Educational Quality	acbgacu1-3	Emphasis school places on teaching specific language and literacy skills to learners in Grades 1-4	ZScore (Scalegacu)	.702
	acbgme1-12	Grade at which specific reading skills and strategies first receive major emphasis in instruction in the school	ZScore (Scaleme)	.702
	acbgsi1-14	School's capacity to provide instruction affected by a shortage or inadequacy of specific issues	acbgsi1-14	Removed from model
Time	acbgtac1-7	Percentage of principal's time that is devoted to specific activities	acbgtac1-7	Removed from model
	acbgtach	The amount of hours per week spent on different activities	acbgtach	Removed from model
	acbgidy (ACBGZ003)	The amount of days per year the school is open for instruction	ZScale (ACBGZ003)	.700
	acbgrii	Informal initiatives to encourage learners to read	ZScale (acbgrii)	.700
Opportunity Used	acbgpro1-5 (ACBGZ049-053)	Frequency in providing specific services by the school for Grade 5 learners and/or their families 9-053)	ScaleZ49	Removed from model
	acbgma1-6	School's use of the specific materials in reading instructional programme for learners in Grades 1-4	ZScale (Scalema)	.763

Table 7.12 indicates the removal of a further number of variables from the model. The variable named 'acbgsi' (the school's capacity to provide instruction affected by a shortage or inadequacy of specific issues) appears to be a

stronger indicator of resources than of educational quality. The removal of items 'acbgtac' (the percentage of principal's time that is devoted to specific activities) and 'acbgtach' (the number of hours per week spent on different activities) is based on grounds similar to those for the Teacher Questionnaire percentage item. The same question was posed to school principals, and was answered poorly and unreliably. Many school principals did not comply with the instruction, resulting in unreliable responses often exceeding 100% in total.

The removal of item 'ACBGZ049-ACBGZ053' (the frequency of provision of specific services by the school for Grade 5 learners and/or their families) is based on closer scrutiny of the item, which seems to be a stronger indicator of parent-school relations, and not necessarily the opportunity offered by schools to improve reading ability.

Separate variance computations per factor indicates that the factor 'educational quality' explains 50.7% of the variance, while 'time' explains 51% of the variance in the model.

Table 7.13 indicates the school-level component extraction based on standardized scores from the PIRLS 2006 Teacher Questionnaire:

Table 7.13: Factor Extraction with Standardized School-Level Scores from the Teacher Questionnaire

Factor as Measured by Creemers' Model	PIRLS 2006 Variable Name	Variable Description	New Variable Name	Component Score
Educational Quality	atbgcstd	The number of learners in the class	atbgcstd	Removed
	atbgercn	Provision for enrichment reading instruction	atbgercn	Removed
	atbglicr	Availability of a library or reading corner in the classroom	atbglicr	Removed
	atbghwr1	Frequency of assigning reading as part of homework (for any subject)	atbghwr1	Removed
	atbgbhr1-8	Teacher strategies if a learner begins to fall behind in reading	ZScore (Scalegbhr)	.745
	atbgmsr 1-4	Emphasis that is placed on specific sources to monitor learners' progress in reading	ZScore (Scalegmsr)	.798
	atbgasp1-7	Frequency of using specific tools to assess learners' performance in reading	ZScale (Scalegasp)	.775
Time	atbgacth	The amount of time per week spent on English language instruction and/or activities with the learners	ZScore (atbgacth)	.493
	atbgfrdh	The amount of time that is explicitly for formal reading instruction	ZScore (atbgfrdh)	.539
	atbghwr 2	The amount of time learners are expected to spend on homework involving reading (for any subject)	ZScore (atbghwr2)	.264
	atbgract	Frequency teacher has reading instruction and/or reading activities with the learners	ZScore (atbgract)	-.232
Opportunity Used	atbgria1-9	Frequency of using specific resources when doing reading activities/instruction	ZScore (Scalegria)	.779
	atbgra1-10	Frequency of doing specific activities when doing reading activities/instruction	ZScore(Scalegra)	.842
	atbgdev1-7	Frequency teacher requires of learners to engage in specific activities to help develop reading comprehension skills or strategies	ZScore (Scaledev)	.814

Table 7.13 implies that the first four indicators of the factor referred to by Creemers as 'Educational Quality' has been removed from the model. In discussion with HLM experts[13], closer investigation of the items may be indicative of school resources, not of the provision of educational quality. Item 'atbgract' (the frequency a teacher has with reading instruction and/or reading activities with the learners) has also been removed from further analysis at school-level in light of its negative component score.

Variance in reading achievement accounted for by each of Creemers' factors was computed separately. The factor 'educational quality' explains 59.8% of the reading achievement score variance, with 'time' explaining 38% of the variance. The factor 'opportunity used' explains 66% of variance in the model.

7.4. SUMMARY OF MODELS TO BE USED IN HLM ANALYSIS

The construction of the explanatory scales which are to be used at the learner-level and school-level resulted in the inclusion of some PIRLS 2006 items in the model based on strong factor component scores. In some cases, items were removed due to negative factor component scores or based on decisions that items may theoretically not be as suitable in measuring one of the desired factors from the Creemers model.

Table 7.14 indicates the variables that have been included in measuring the factors 'time', 'opportunity used' and 'social background' at the learner-level:

[13] Prof Roel Bosker, Rijksuniversiteit Groningen, visited from 01-15 July 2009.

Table 7.14: Model Variables Included at the Learner-Level

Factor as Measured by Creemers' Model	PIRLS 2006 Variable Name	Variable Description	PIRLS 2006 Questionnaire Source
Time	asbgtoc1-7	Frequency of reading related activities outside of school	Learner questionnaire
	asbgrto1-10	Frequency of specific reading activities outside of school	Learner questionnaire
	asbgtsp1-5	Time spent engaging in activities outside of school on a normal school day	Learner questionnaire
	asbhtsoh	Time spent on reading homework as reported by parents	Parent questionnaire
	asbhread	Parents' time spent on reading related activities	Parent questionnaire
Opportunity Used	asbgthc1-6	Frequency of reading related activities in school	Learner questionnaire
	asbgafr1-4	Types of reading activities learners are afforded after reading	Learner questionnaire
	asbhha1-11	Opportunities used by parents/caregivers to engage the child in pre literacy activities	Parent questionnaire
	asbhdot1-10	Opportunities used by parents/caregivers to engage the child in reading related activities	Parent questionnaire
	asbhrre	Opportunities parents use to read for their own enjoyment	Parent questionnaire
Social Background	asbgbook	Number of books in the home	Learner questionnaire
	asbgta1-17	Resources in the home e.g. running water, electricity, television	Learner questionnaire
	asbhchbk	Number of children's books in the home	Parent questionnaire
	asbhledf	The highest level of education completed by the child's father	Parent questionnaire
	asbhledm	The highest level of education completed by the child's mother	Parent questionnaire

Table 7.15 indicates the variables that have been included in measuring the factors 'time', 'opportunity used' and 'educational quality' at the school-level:

Table 7.15: Model Variables Included at the School-Level

Factor as Measured by Creemers' Model	PIRLS 2006 Variable Name	Variable Description	PIRLS 2006 Questionnaire Source
Educational Quality	acbgacu1-3	Emphasis school places on teaching specific language and literacy skills to learners in Grades 1-4	School questionnaire
	acbgme1-12	Grade at which specific reading skills and strategies first receive major emphasis in instruction in the school	School questionnaire
	atbgbhr1-8	Teacher strategies if a learner begins to fall behind in reading	Teacher questionnaire
	atbgmsr 1-4	Emphasis that is placed on specific sources to monitor learners' progress in reading	Teacher questionnaire
	atbgasp1-7	Frequency of using specific tools to assess learners' performance in reading	Teacher questionnaire
Time	acbgidy (ACBGZ003)	The amount of days per year the school is open for instruction	School questionnaire
	acbgrii	Informal initiatives to encourage learners to read	School questionnaire
	atbgacth	The amount of time per week spent on English language instruction and/or activities with the learners	Teacher questionnaire
	atbgfrdh	The amount of time that is explicitly for formal reading instruction	Teacher questionnaire
	atbghwr 2	The amount of time learners are expected to spend on homework involving reading (for any subject)	Teacher questionnaire
Opportunity Used	acbgma1-6	School's use of the specific materials in reading instructional programme for learners in Grades 1-4	School questionnaire
	atbgria1-9	Frequency of using specific resources when doing reading activities/instruction	Teacher questionnaire
	atbgra1-10	Frequency of doing specific activities when doing reading activities/instruction	Teacher questionnaire
	atbgdev1-7	Frequency teacher requires of learners to engage in specific activities to help develop reading comprehension skills or strategies	Teacher questionnaire

CHAPTER 8: HIERARCHICAL LINEAR MODEL RESULTS

"The world may be full of fourth-rate writers, but it is also full of fourth-rate readers"

Stan Barstow

This chapter will provide overall results for the two-level models at learner- and school-level for the PIRLS 2006 South African data, followed by the particular results for each of the language groupings separately. Research questions 3, 4 and 5, as outlined in Chapters 1 and 5 of this research, seek to investigate the factors related to the learners' backgrounds, for example motivation to read, language skills and home environment, that affect performance in reading literacy. Also of interest is the extent to which the school and classroom environments affect reading literacy performance, and the manner in which these relationships between factors and performance differ or remain constant across the country's 11 official languages (within the five language groupings for which test results are available).

For the purposes of answering the questions, Hierarchical Linear Modeling (HLM) was used to determine the strength of evidence for the effect of a number of explanatory variables at learner- and school-level on reading achievement as response or dependent variable, while controlling for language.

For the sake of clarity and the interpretation of results, a number of data considerations deserve mention here. Firstly, the PIRLS 2006 South African data was subject to many missing data values for some explanatory variables. These missing values were accounted for by imputing zeros, since the average of the factor score used as basis for the decision to include or exclude explanatory variables from the model, at each level, is zero. The imputation has the consequence of never allowing a missing value to be taken as an indicator of some explanatory use or effect. A second consideration pertains to the use of plausible values (as discussed in Chapter 5) when running analyses. In using HLM, each of the five response or achievement variables comprised of

plausible values which was used as an outcome variable. This strategy was an attempt to deal with the limitations of achievement data in contexts where learners answer very few items.

For the purposes of this results chapter, it is important to distinguish between two different meanings of the word 'significant' as it will be used in this chapter. Statistical significance implies the presence of a numerically discernible contrast or difference between summary statistics obtained from the data. Whether or not the discernible difference is important or consequential is a non-statistical issue, and for this study the judgment of educators and specialists will be relevant and appropriate. On the other hand, it also has to be kept in mind that important differences may exist within comparisons made from the data, but may fail to generate a signal of statistical significance. This lack of statistical significance in such circumstances might be attributed to the limited size of the data set as the size may not adequately compensate for its large internal variability of performance. The hope in this study is that the numbers of schools providing data may be sufficient to allow evidence for deeper insights into reading to emerge.

Lastly, for all the models, data was weighted using the Houseweight (HOUWGT)[14], which is a transformation of the total student weight (TOTWGT) and ensures that the weighted sample corresponds to the actual sample size and population structure in each country (Foy & Kennedy, 2008; Dalton & Provasnik, 2009).

In light of the research questions and the use of HLM, the remainder of this chapter will provide results for an overall South African model, which comprises only those variables at learner- and school-level which have been selected for the explanatory purposes of this study (described in Chapter 7 and presented here in section 8.1). Results for the overall model will be followed by results for two models for each language grouping that are presented separately for each

[14] HOUWGT is proportional to TOTWGT multiplied by the ratio of the sample size (n) divided by the sum of the weights over all learners in the grade.

of the five language groupings (section 8.2 to 8.6), first at learner-, then at school-level.

It will be noted that only one overall model is presented for this study, while models for each of the language groupings are separated at learner- and school-level. As a practical consideration, a single overall model presents an overall picture of the data first in as concise and clear manner as possible.

8.1. RESULTS FOR THE OVERALL SOUTH AFRICAN MODEL AT LEARNER- AND SCHOOL-LEVEL

Chapter 7 provided detailed information on the selection criteria and ultimate selection of variables for inclusion in the two-level models. For purposes of the overall model, all these selected variables were included at both learner- and school-level to explore an overall picture of the South African Grade 5 reading achievement landscape in light of the PIRLS 2006 data.

Results of the overall South African model are preceded by presenting a null (or empty) model. The null model (as also used by Shalabi, 2002, Howie, 2002 and described by Luke, 2004; Hox, 2002 and Heck & Thomas, 2000) has no explanatory variables and should provide the basic partition of the variability in the data between the learner- and school-level in the ensuing models. The null model can therefore be expressed as:

$$\beta 0 = \gamma 00 + U0$$

$\beta 0$ is the level 1 reference intercept, $\gamma 00$ is the mean value of the level-1 outcome across all level-2 units, and $U0$ is the deviation from the grand mean. Table 8.1 (below) shows the results of the overall null model:

Table 8.1: Estimation of the Variance Components for the Overall Null Model

Variables	Estimate	SE
Grand mean	307.3	8.0
Variance components:		
School-level	12 693.7	
Learner-level	7 290.2	

Table 8.1 (above) indicates the existence of significant differences between South African schools in reading literacy achievement. The between school variance for the null model is 42%[15] of the total variance. Based on the partition of this variability, an overall South African model, populated with explanatory variables, can be presented.

At school-level, school and classroom variables of *educational quality*, *time spent on reading activities* and *opportunities created for reading* are included in the model. *Educational quality* refers specifically to those activities undertaken by teachers in the classroom to teach, promote and engage learners in reading. *Time spent on reading* refers to the measurable aspects of actual time devoted to reading activities by the teacher and the school. *Opportunities created by teachers* at classroom-level and schools are those opportunities afforded to Grade 5 learners to engage in reading at school, variables related to the existence of *informal initiatives, the use of materials in school and the involvement of parents in school activities.*

At learner-level, variables concerning the learner and the parent include aspects similar to those included in the school-level model. *Time spent on reading, opportunities used for reading by learner and parent*, as well as *learner- and parent social background* are included in the model. Aspects at learner-level include learner *age and sex*, since these biographical variables have repeatedly been shown to be significant predictors of reading achievement (see Chapter 3).

[15] The percentage of explained variance for the null model was obtained as follows: 12 693.7-7 290.2/12 693.70 = 0.42 or 42% variance. This procedure was followed in computing variance for all models discussed in this chapter.

The overall South African learner-level and learner- and school-level model can be presented as:

LEVEL 1 MODEL (bold: group-mean centering; bold italic: grand-mean centering)

$$ASRREA01 = \beta_0 + \beta_1(ITAGE) + \beta_2(ITSEX) + \beta_3(TIMEL) + \beta_4(OPPUSEL) + \beta_5(TIMEPAR) + \beta_6(OPPPAR) + \beta_7(SOCLP) + \beta_8(MISSLORP) + r$$

LEVEL 2 MODEL (bold italic: grand-mean centering)

$$\beta_0 = \gamma_{00} + \gamma_{01}(MSOCLP) + \gamma_{02}(AFR) + \gamma_{03}(NGU) + \gamma_{04}(SOTH) + \gamma_{05}(TSHI) + \gamma_{06}(QUALT) + \gamma_{07}(TIMET) + \gamma_{08}(OPPUSET) + \gamma_{09}(QUALEDS) + \gamma_{010}(TIMES) + \gamma_{011}(OPPORS) + u_0$$

$$\beta_1 = \gamma_{10}$$

$$\beta_2 = \gamma_{20}$$

$$\beta_3 = \gamma_{30}$$

$$\beta_4 = \gamma_{40}$$

$$\beta_5 = \gamma_{50}$$

$$\beta_6 = \gamma_{60}$$

$$\beta_7 = \gamma_{70}$$

$$\beta_8 = \gamma_{80}$$

In the level-1 model, explanatory variables for learners have been named as follows:

Table 8.2: Variable Naming Conventions for the Level-1 Model

Variable Name	Description
ITAGE	Age of the learner
ITSEX	Sex of the learner
TIMEL	Reading time spent by the learner
OPPUSEL	Reading opportunity used by the learner
TIMEPAR	Reading time spent by the parent
OPPAR	Reading opportunity used by the parent
SOCLP	Social background of the learner and parent
MISSLORP	Missing data for either parents or learners

In the level-2 model, explanatory variables have been named as follows:

Table 8.3: Variable Naming Conventions for the Level-2 Model

Variable Name	Description
MSOCLP	Socio-economic status of school as derived from learner and parent data
AFR	Afrikaans learners
NGU	Nguni learners
SOTH	Sotho learners
TSH	Tshivenda learners
QUALT	Quality of teachers
TIMET	Time spent by teachers on reading
OPPUSET	Reading opportunities used by teachers
QUALEDS	Educational quality of the school
TIMES	Time spent on reading by the school
OPPORS	Reading opportunities used by the school

The naming convention for variables remains the same for the purposes of all models to follow with ASRREA01 (reading achievement score) as dependent variable.

Table 8.4 (below) provides results for the overall South African model, one in which English was used as control language. Of all the official languages represented in the PIRLS 2006 sample, the English group of learners represents the most diverse group, including first, second and third language speakers. The intercept indicated provides a reference value for South African Grade 5 readers with an average English reading achievement score of 524.3 (SE=22.5) for this model. This intercept is arbitrary and is much higher than the average PIRLS 2006 assessment score for Grade 5 English learners of 400 (see Chapter 6). Because the intercept is affected by the coefficients and the explanatory variables in the model, it has to be kept in mind that the intercept is influenced by two aspects: firstly, it is a prediction of what reading achievement scores would have been had all responses to items for all learners been available. Secondly, it is influenced by the addition of coefficients or explanatory variables to the model.

All coefficients provided in Table 8.4 are therefore interpreted as changes from the reference. Every one point increase or decrease in explanatory variables results in a change determined by a coefficient reported in the table.

Table 8.4: Overall Final Model Results for the PIRLS 2006 South African Data

Factor Name	Fixed Effect	Coefficient	Standard Error	P-Value
	Intercept	524.33	22.53	0.00
School and Classroom-Level				
MSOCLP	School socio-economic status	69.10	5.21	0.00
AFR	Afrikaans	-10.93	11.17	0.32
NGU	Nguni	-70.90	12.75	0.00
SOTH	Sotho	-68.00	11.80	0.00
TSH	Tshivenda	-73.51	15.80	0.00
QUALT	Teacher quality	11.87	5.66	0.03
TIMET	Teacher time spent on reading in class	1.09	5.34	0.83
OPPUSET	Reading opportunity created by teacher	-14.12	5.44	0.01
QUALEDS	School educational quality	6.80	3.65	0.06
TIMES	School time spent reading	8.90	4.03	0.02
OPPORS	Reading opportunity created by school	1.18	3.30	0.71
Learner-Level				
ITAGE	Learner age	-8.76	2.00	0.00
ITSEX	Learner sex	-27.50	2.80	0.00
TIMEL	Learner time spent reading	-9.55	1.42	0.00
OPPUSEL	Reading opportunity used by learner	10.50	1.33	0.00
TIMEPAR	Reading time created by parent	2.00	1.24	0.11
OPPAR	Reading opportunity created by parent	-8.32	1.27	0.00
SOCLP	Learner and parent social background	6.30	1.51	0.00

Table 8.4 (above) indicates that, after taking all explanatory variables into account, Afrikaans learner achievement is 10.9 points (SE=11.2) lower than English, which serves as the control language for this model. This decrease is, however, not statistically significant, therefore there is no statistical difference between Afrikaans and English learners' reading achievement. However, all the African language grouping average reading achievement scores are lower than the reference – a significant decrease of 70.9 points (SE=12.8) for the Nguni group, a significant 68.0 point (SE=11.8) decrease for the Sotho grouping, as well as a significant 73.5 point (SE=15.8) decrease for Tshivenda. These results indicate that, relative to English, the Afrikaans language grouping is the only

one of the five tested South African language groupings whose average reading achievement score does not differ significantly from English, the control language for which the intercept was 524.3 (SE=22.5). On the other hand, children writing the test in the African language groupings tend to achieve considerably lower scores than those in Afrikaans and English.

Table 8.4 (above) also indicates that none of the classroom-level variables are significant[16] in the overall model. The only significant factor at school-level is the *reading opportunity created by the teacher*. Where teachers fail to create such opportunities for learners, average reading achievement appears to be 14.1 (SE=5.4) points lower.

A variable for school socio-economic status was included in the analyses. This variable was created to convey the social background of the school by averaging indices of resources across Grade 5 learners. The interpretation of the model now allows for explanations of teacher and school-level time spent on *reading, opportunities created by the teacher and school for reading* and *the quality of teachers* that may vary across the districts within those socio-economic contexts that are accounted for in the model. The overall model therefore shows that, after taking teacher and school time spent on reading, opportunities created for reading and teacher quality into account, school socio-economic status nonetheless show 69.1 (SE=5.2) points higher average reading achievement. The large and educationally important effect of school socio-economic status of learners in this South African model is therefore consistent with other research, including that of Bos, Schwippert and Stubbe (2007), who refer to 'social capital' when identifying socio-economic status as the major predictor of differential reading achievement.

Explanatory factors at the learner-level are all statistically significant contributors to average reading achievement scores, except for reading time created by parents. The overall results show that for each additional year of learner age in Grade 5, reading achievement is lower by 8.76 (SE=2.0) points.

[16] Significance for all models is reported where p=<0.01.

Sex differences in reading achievement favour girls by 27.5 (SE=2.8) points[17]. Where learners do not spend time on reading, reading achievement scores are lower by 9.6 (SE=1.4) points. Where learners use opportunities to read, reading achievement is 10.5 (SE=1.3) points higher. The different effects of these two factors on reading achievement may point to possible interaction effects, since there may only be a conceptual distinction between time spent on reading and opportunities used to read. Nevertheless, learner-level factors indicate a pattern where older learners (boys in particular), who spend less time on reading, who do not use opportunities to read and who are likely to come from lower socio-economic backgrounds, tend to achieve lower scores in reading.

Where parents fail to create opportunities for their children to read, average reading achievement is lower by 8.3 (SE=1.2) points. Significantly, Table 8.4 (above) shows that parents' reported time spent on reading with their children does not greatly influence average reading achievement scores. Whilst the reason for this result is not clear, it does not necessarily imply that time has no influence. It is also possible that parents may over-report the time that spent on reading with their children.

Lastly, the overall South African model indicates that parent and learner social background, as measured by possessions in the home and parents' level of educational qualifications is significantly associated with average reading achievement scores. In higher socio-economic households, average reading scores are higher by 6.3 (SE=1.5) points compared to those households with lower socio-economic status, fewer possessions and lower educational qualifications for parents. These factors are all interrelated and confirm research conducted internationally.

Table 8.5 indicates the variance components for the overall model:

[17] All variables were coded from low to high. In the case of sex, girls are identified by 1, boys by 2, therefore the decrease in reading achievement scores would pertain to boys' achievement. In the case of time spent on reading, low frequencies (never or almost never) were coded as 1, high frequencies (once or twice a week or every day) were coded as 2.

Table 8.5: Variance Components for the Overall Model

Variance between schools	7 671.91
Variance within schools	6 822.94

The variance component of the overall model when language groupings are not included in the model indicates that the variance between schools (7 671.91) is larger than the variance within schools (6 822.94). This means that 11% of variance in reading literacy achievement is accounted for at school-level. This pattern is typical of that found in developing countries (Howie, 2002; Passos, 2009) and contrary to the pattern of variance in developed countries where variance within schools is larger than that between schools. An implication of a larger variance between schools means that interventions may more easily be implemented, since the intervention can be tailored at school-level to meet the needs of the school. With a larger variance within schools, planning and implementing interventions become more complicated, since differences at classroom-level are much more varied and particular interventions that are not specially designed for individual circumstances often do not address the variations encountered within the class.

However, with the inclusion of language groupings in the model, the variance component changes significantly to a pattern where variance within schools is larger than between (6 687.03 within schools as opposed to 2 512.04 between schools). This difference in variance components for the overall model suggests that the inclusion of language groupings in the model accounts for 36% of variance in the overall South African model. Figure 8.1 (below) illustrates the changes in variance given the three scenarios, namely the estimated variance for the null model (42%), the substantial decrease in variance for the overall model without controlling for language groupings (11%), and the increased variance for the overall model with the addition of language groupings (36%):

The remainder of this chapter will provide results of models for each of the language groupings separately in order to ascertain the particular explanatory factors for each of the language groupings at learner-, classroom- and school-level.

8.2. RESULTS FOR THE AFRIKAANS MODEL

A total number of 1 678 Grade 5 learners completed the PIRLS 2006 assessment in Afrikaans. This number of learners represents not only those who speak Afrikaans at home, but also those who speak another language at home but who have been receiving instruction in Afrikaans from Grade 1 to Grade 3 at an Afrikaans-medium school. Grade 5 learners who wrote the PIRLS 2006 assessment in Afrikaans achieved the highest average score of all the language groupings (415.7, SE=12.0).

The null model for the Afrikaans language grouping resulted in the following estimated variance components:

Table 8.6: Estimation of the Variance Components in the Afrikaans Null Model

Variables	Estimate	SE
Grand mean	414.9	18.7
Variance components:		
School-level	17 552.7	
Learner-level	7 449.3	

As indicated by Table 8.6 (above), the Afrikaans school-level variance is substantially larger than the learner-level variance, resulting in the between school variance for Afrikaans learner reading achievement in the null model as 57% of the total variance.

Two Afrikaans models were generated, the first including only learner-level factors, the second learner- and school-level factors. Table 8.7 (below) provides results for the Afrikaans model where learner-level factors of *age, sex*, *learner time spent on reading* and *reading opportunity used by learners* were included. Parental factors included in the final selected model were *time spent by parents to read with the child, opportunities created by parents for reading* and *social background* as measured by possessions in the home and parental qualifications. The Afrikaans learner-level model output is reported in Table 8.7:

LEVEL 1 MODEL (bold: group-mean centering; bold italic: grand-mean centering)

$$ASRREA01 = \beta_0 + \beta_1(ITAGE) + \beta_2(ITSEX) + \beta_3(TIMEL) + \beta_4(OPPUSEL) + \beta_5(TIMEPAR) + \beta_6(OPPPAR) + \beta_7(SOCLP) + \beta_8(MISSLORP) + r$$

LEVEL 2 MODEL (bold italic: grand-mean centering)

$$\beta_0 = \gamma_{00} + u_0$$
$$\beta_1 = \gamma_{10}$$
$$\beta_2 = \gamma_{20}$$
$$\beta_3 = \gamma_{30}$$
$$\beta_4 = \gamma_{40}$$
$$\beta_5 = \gamma_{50}$$
$$\beta_6 = \gamma_{60}$$
$$\beta_7 = \gamma_{70}$$
$$\beta_8 = \gamma_{80}$$

Table 8.7: Afrikaans Learner-Level Model Results

Factor Name	Fixed Effect	Coefficient	Standard Error	P-Value
	Intercept	405.21	15.08	0.00
Learner-Level				
ITAGE	Learner age	-16.28	3.13	0.00
ITSEX	Learner sex	-25.50	5.00	0.00
TIMEL	Learner time spent reading	-5.40	2.74	0.06
OPPUSEL	Reading opportunity used by learner	2.33	2.90	0.41
TIMEPAR	Reading time created by parent	3.25	2.22	0.14
OPPAR	Reading opportunity created by parent	-9.75	2.70	0.00
SOCLP	Learner and parent social background	12.00	2.28	0.00

For this model, a sizeable drop of 16.3 (SE=3.1) points is suggested for each additional year of age of a child in Grade 5 that the child remains in Grade 5. The model also fits a 25.5 (SE=5.0) points lower average achievement score for Afrikaans boys compared to girls. The time spent on reading by these learners and opportunities used to read, do not significantly affect average reading scores. Parents who create time to read with their children are not a significant factor in this model, yet parents who do not create the opportunities to read are associated with a significant 9.8 (SE=2.7) points lower average reading score.

For the Afrikaans learner-level model, there is an interaction effect between parental time spent on reading and opportunities created to read. As was the situation in the overall model, a decrease in one factor with an increase in the other indicates possible interaction. Of interest in the Afrikaans model is the social background of learners, with a 12.0 (SE=2.3) points higher average reading score for those learners in possession of basic (and some luxury) belongings at home and parents with educational qualifications.

Table 8.8 indicates the variance component for this part of the model:

Table 8.8: Variance Components for the Afrikaans Model:

Variance between learners	11 801.60
Variance within learners	6 663.81

Table 8.8 (above) indicates that variance between Afrikaans learners is larger than variance within learners, therefore 43% of variance in reading achievement for Afrikaans learners is explained at learner-level. The data suggest the school-level variables should be explored as possible explanatory factors for school variability. School-level factors are therefore included in the model:

LEVEL 1 MODEL (bold: group-mean centering; bold italic: grand-mean centering)

$$ASRREA01 = \beta_0 + \beta_1(ITAGE) + \beta_2(ITSEX) + \beta_3(TIMEL) + \beta_4(OPPUSEL) + \beta_5(TIMEPAR) + \beta_6(OPPPAR) + \beta_7(SOCLP) + \beta_8(MISSLORP) + r$$

LEVEL 2 MODEL (bold italic: grand-mean centering)

$$\beta_0 = \gamma_{00} + \gamma_{01}(MSOCLP) + \gamma_{02}(QUALT) + \gamma_{03}(TIMET) + \gamma_{04}(OPPUSET) + \gamma_{05}(QUALEDS) + \gamma_{06}(TIMES) + \gamma_{07}(OPPORS) + \gamma_{08}(MISSTORS) + u_0$$

$$\beta_1 = \gamma_{10}$$

$$\beta_2 = \gamma_{20}$$

$$\beta_3 = \gamma_{30}$$

$$\beta_4 = \gamma_{40}$$

$$\beta_5 = \gamma_{50}$$

$$\beta_6 = \gamma_{60}$$

$$\beta_7 = \gamma_{70}$$

$$\beta_8 = \gamma_{80}$$

Table 8.9: Afrikaans Learner- and School-Level Model Results

Factor Name	Fixed Effect	Coefficient	Standard Error	P-Value
	Intercept	379.10	6.75	0.00
School and Classroom-Level				
MSOCLP	School socio-economic status	87.60	6.26	0.00
QUALT	Teacher quality	6.60	8.34	0.43
TIMET	Teacher time spent on reading in class	2.88	13.80	0.83
OPPUSET	Reading opportunity created by teacher	5.36	9.06	0.55
QUALEDS	School educational quality	14.34	6.26	0.02
TIMES	School time spent reading	8.34	6.55	0.56
OPPORS	Reading opportunity created by school	1.31	7.50	0.86
Learner-Level				
ITAGE	Learner age	-16.49	3.13	0.00
ITSEX	Learner sex	-25.48	4.94	0.00
TIMEL	Learner time spent reading	-5.13	2.70	0.06
OPPUSEL	Reading opportunity used by learner	3.13	2.90	0.27
TIMEPAR	Reading time created by parent	2.70	2.23	0.23
OPPAR	Reading opportunity created by parent	-10.05	2.70	0.00
SOCLP	Learner and parent social background	10.02	2.32	0.00

Results for the Afrikaans model shows that none of the selected school-level factors included in the model have a significant effect on average reading achievement scores apart from the school socio-economic variable. This predictor is associated with a significant 87.6 (SE=6.3) points higher average reading achievement score for learners who receive instruction in Afrikaans. The impact of the socio-economic variable may also be explained by the large contingent of Coloured learners who attend Afrikaans schools, specifically in the Western and Northern Cape. These learners are generally from lower socio-economic households, in stark contrast to their White counterparts who are generally from more affluent backgrounds. Within the Afrikaans learner population, sharp contrasts therefore exist in terms of socio-economic background.

Statistically significant variables of the learner-level model appear again in the fitted multi-level model. Average reading achievement is lower by 16.5 (SE=3.1) for each additional year of age amongst Afrikaans Grade 5 learners. Sex is associated with a 25.5 (SE=4.9) higher average for Afrikaans girls compared to Afrikaans boys. The claimed opportunities created by parents to engage their children in reading is associated with 10.1 (SE=2.7) points lower reading achievement. The social background of learners is associated with 10.0 points (SE=2.3) higher average for those children from higher socio-economic background.

The variance components of the Afrikaans model confirm that school variability is strongly tied to socio-economic status and perhaps school educational quality:

Table 8.10: Afrikaans Model Variance Components without and with School-Level Variables

	Afrikaans Learner-Level Model Only	**Afrikaans Learner and School-Level Model**
Variance between schools	11 801.58	2 590.25
Variance within schools	6 663.81	6 659.66

The changes in variance indicated by Table 8.10 (above) means that 47%[18] of variance is accounted for by the addition of school-level variables to the Afrikaans model.

8.3. RESULTS FOR THE ENGLISH MODEL

For PIRLS 2006, the group of Grade 5 learners completing the assessment in English possibly constitutes the most heterogeneous group of learners. Some speak English at home, but there are many learners from African language backgrounds whose parents prefer them to attend schools where they receive instruction in English. The group therefore comprises not only English first language speakers, but also English second- or even third-language speakers who receive instruction in English. This phenomenon is particularly apparent for inner-city and urban schools, where many parents from townships choose to send their children to English medium schools instead of township schools.

The null model for the English grouping generated the following estimates:

Table 8.11: Estimation of the Variance Components in the English Null Model

Variables	Estimate	SE
Grand mean	418.33	18.1
Variance components:		
School-level	10 486.9	
Learner-level	7 405.6	

This output confirms the presence of substantial variability associated with schools.

The PIRLS 2006 average result for the English group of Grade 5 learners was 398.0 (SE=17.1), with 2 793 learners having completed the assessment in

[18] Variance for the learner model was obtained as follows: 11 801.58+6 663.81=18 465.39. Variance for the learner and school model was obtained as 2 590.25+6 659.66=9 249.91, resulting in the subtraction of learner and school model variance from learner model variance (17 465.39-9 249.91=8 215.48). The final result of 8 215.48/17 465.39 resulted in 0.47, or 47% variance. This procedure was followed in computing variance for all models discussed in this chapter.

English. Two English models were generated, the first including only learner-level factors, the second including learner- and school-level factors. The English learner-level model notation is followed by Table 8.12, which reports learner-level results:

LEVEL 1 MODEL (bold: group-mean centering; bold italic: grand-mean centering)

$$ASRREA01 = \beta_0 + \beta_1(ITAGE) + \beta_2(ITSEX) + \beta_3(TIMEL) + \beta_4(OPPUSEL) + \beta_5(TIMEPAR) + \beta_6(OPPPAR) + \beta_7(SOCLP) + \beta_8(MISSLORP) + r$$

LEVEL 2 MODEL (bold italic: grand-mean centering)

$$\beta_0 = \gamma_{00} + u_0$$
$$\beta_1 = \gamma_{10}$$
$$\beta_2 = \gamma_{20}$$
$$\beta_3 = \gamma_{30}$$
$$\beta_4 = \gamma_{40}$$
$$\beta_5 = \gamma_{50}$$
$$\beta_6 = \gamma_{60}$$
$$\beta_7 = \gamma_{70}$$
$$\beta_8 = \gamma_{80}$$

Table 8.12: English Learner-Level Model Results

Factor Name	Fixed Effect	Coefficient	Standard Error	P-Value
	Intercept	412.91	13.93	0.00
Learner-Level				
ITAGE	Learner age	-31.70	6.44	0.00
ITSEX	Learner sex	-23.70	5.60	0.00
TIMEL	Learner time spent reading	-9.00	3.66	0.02
OPPUSEL	Reading opportunity used by learner	3.17	4.81	0.51
TIMEPAR	Reading time created by parent	1.75	3.11	0.57
OPPAR	Reading opportunity created by parent	-11.20	3.31	0.00
SOCLP	Learner and parent social background	14.00	3.09	0.00

The English learner-level model indicates associations between assessment scores and the factors learner *age, sex, opportunities created by parents to engage their children in reading* and *social background*. Older age groups in Grade 5 have reading scores some 31.7 points (SE=6.4) lower for each

additional increase of one year in age. Boys achieve on average 23.7 points (SE=5.6) lower than girls. Opportunities created by parents are linked to 11.2 point (SE=3.3) lower reading achievement. It is possible that parents of lower achievement learners are over-reporting opportunities they create.

Table 8.13 (preceded by the model notation) provides results for the English level model when classroom- and school-level variables are added to the learner-level variables:

LEVEL 1 MODEL (bold: group-mean centering; bold italic: grand-mean centering)

$$ASRREA01 = \beta_0 + \beta_1(ITAGE) + \beta_2(ITSEX) + \beta_3(TIMEL) + \beta_4(OPPUSEL) + \beta_5(TIMEPAR) + \beta_6(OPPPAR) + \beta_7(SOCLP) + \beta_8(MISSLORP) + r$$

LEVEL 2 MODEL (bold italic: grand-mean centering)

$$\beta_0 = \gamma_{00} + \gamma_{01}(MSOCLP) + \gamma_{02}(QUALT) + \gamma_{03}(TIMET) + \gamma_{04}(OPPUSET) + \gamma_{05}(QUALEDS) + \gamma_{06}(TIMES) + \gamma_{07}(OPPORS) + \gamma_{08}(MISSTORS) + u_0$$

$$\beta_1 = \gamma_{10}$$

$$\beta_2 = \gamma_{20}$$

$$\beta_3 = \gamma_{30}$$

$$\beta_4 = \gamma_{40}$$

$$\beta_5 = \gamma_{50}$$

$$\beta_6 = \gamma_{60}$$

$$\beta_7 = \gamma_{70}$$

$$\beta_8 = \gamma_{80}$$

Table 8.13: English Learner- and School-Level Model Results

Factor Name	Fixed Effect	Coefficient	Standard Error	P-Value
	Intercept	405.33	6.26	0.00
School and Classroom-Level				
MSOCLP	School socio-economic status	71.05	7.46	0.00
QUALT	Teacher quality	14.58	9.70	0.13
TIMET	Teacher time spent on reading in class	24.63	13.36	0.07
OPPUSET	Reading opportunity created by teacher	-23.00	8.50	0.10
QUALEDS	School educational quality	3.70	4.30	0.40
TIMES	School time spent reading	3.70	8.03	0.64
OPPORS	Reading opportunity created by school	-0.52	7.56	0.94
Learner-Level				
ITAGE	Learner age	-31.70	6.44	0.00
ITSEX	Learner sex	-23.53	5.62	0.00
TIMEL	Learner time spent reading	-8.06	3.61	0.02

OPPUSEL	Reading opportunity used by learner	4.00	4.84	0.41
TIMEPAR	Reading time created by parent	1.00	3.12	0.75
OPPAR	Reading opportunity created by parent	-11.44	3.28	0.00
SOCLP	Learner and parent social background	11.82	3.23	0.00

Table 8.13 (above) indicates that although teacher- and school-level factors of *quality, time* and *opportunity used to engage learners in reading activities* are not directly significant in the English model, they nevertheless contribute within the social context of a school's socio-economic status. Higher socio-economic status links with higher average reading achievement by 71.1 points (SE=7.5).

At learner-level, *age, sex, opportunities created by parents to engage their children in reading activities* and *social background* remain factors linked to higher or lower reading achievement for the English group of learners. As with the socio-economic status at school-level, a higher social background at learner-level significantly increases reading achievement by 11.8 points (SE=3.2) for English learners.

Table 8.14 reports variance components for the English learner-level only model, and the model with school-level variables:

Table 8.14: English Model Variance Components without and with School-Level Variables

	English Learner-Level Model Only	**English Learner- and School-Level Model**
Variance between schools	6 341.16	1 344.11
Variance within schools	6 339.85	6 335.47

The changes in variance indicated by Table 8.14 (above) mean that 39% of variance is accounted for with the addition of school-level variables to the English model.

8.4. RESULTS FOR THE NGUNI MODEL

The Nguni language grouping consists of Grade 5 learners who wrote the PIRLS 2006 assessment in isiZulu, isiXhosa, isiNdebele, SiSwati and Xitsonga. As a language grouping, learners' average achievement for PIRLS 2006 was 243.3 (SE=4.4), an average score substantially lower than the international average of 500 and lower than average achievement scores obtained by the Afrikaans (351.7, SE=12.0) and English (346.8, SE=17.5) groups of Grade 5 learners. The Nguni language grouping consisted of 6 039 learners, and hence is the largest group of learners amongst the five language groupings.

The null model for the Nguni language grouping resulted in the following estimated variance components:

Table 8.15: Estimation of the Variance Components in the Nguni Null Model

Variables	Estimate	SE
Grand mean	243.3	5.5
Variance components:		
School-level	2 144.4	
Learner-level	7 266.9	

In each of the previous null models presented for the overall, Afrikaans and English groups, school-level variance was substantially larger than the learner-level variance. For the Nguni null model, a reversed situation occurs, where variance at learner-level is much larger than variance found at school-level. The Dutch experience[19] indicates that variation is predominantly found between schools, therefore any interventions can effectively be targeted and implemented at school-level. In South Africa (and more particularly in light of the Nguni model results of this study) the implication of this learner-level variance being larger than the school variance for Black learners serves not only to indicate South Africa's problem in terms of its learner diversity, but also points to problems where any intervention for Nguni learners is likely to be considerably more difficult. In essence, effective intervention cannot be

[19] As discussed with Professor Roel Bosker, Rijksuniversiteit Groningen, The Netherlands

successfully implemented or aimed at the school-level, but must address the presence of substantial variation between learners in the same classrooms.

Two Nguni models were generated, the first including only learner-level factors, the second including learner- and school-level factors. The Nguni learner-level model, followed by Table 8.16, explore for Nguni learners with associations of *age*, *sex, learner and parent time spent on reading, learner opportunities used* and *parental opportunities created to read* as well as *social background*:

LEVEL 1 MODEL (bold: group-mean centering; bold italic: grand-mean centering)

$$ASRREA01 = \beta_0 + \beta_1(ITAGE) + \beta_2(ITSEX) + \beta_3(TIMEL) + \beta_4(OPPUSEL) + \beta_5(TIMEPAR) + \beta_6(OPPPAR) + \beta_7(SOCLP) + \beta_8(MISSLORP) + r$$

LEVEL 2 MODEL (bold italic: grand-mean centering)

$$\beta_0 = \gamma_{00} + u_0$$
$$\beta_1 = \gamma_{10}$$
$$\beta_2 = \gamma_{20}$$
$$\beta_3 = \gamma_{30}$$
$$\beta_4 = \gamma_{40}$$
$$\beta_5 = \gamma_{50}$$
$$\beta_6 = \gamma_{60}$$
$$\beta_7 = \gamma_{70}$$
$$\beta_8 = \gamma_{80}$$

Table 8.16: Nguni Learner-Level Model Results

Factor Name	Fixed Effect	Coefficient	Standard Error	P-Value
	Intercept	360.06	28.90	0.00
Learner-Level				
ITAGE	Learner age	-3.96	2.43	0.11
ITSEX	Learner sex	-31.00	4.37	0.00
TIMEL	Learner time spent reading	-11.31	2.24	0.00
OPPUSEL	Reading opportunity used by learner	14.38	2.05	0.00
TIMEPAR	Reading time created by parent	1.81	1.87	0.33
OPPAR	Reading opportunity created by parent	-4.40	2.61	0.10
SOCLP	Learner and parent social background	-27.14	4.28	0.00

The Nguni learner-level model output reports that learner *sex* is linked to reading achievement. Nguni boys achieve on average 31.0 points (SE=4.4) lower than girls. Interestingly, *age* is not a significant factor for the Nguni group, unlike for the Afrikaans and English groups of learners. *Learner time spent on reading* and *reading opportunities used by learners* are linked to contrasting effects. Learners who spend some time reading have a lower level of reading achievement (-11.3, SE=2.2) and learners using opportunities to read have higher reading achievement (14.38, SE=2.1).

As in the Afrikaans and English models at learner-level, learner *social background* significantly associates with reading achievement. For Nguni learners, average reading achievement scores are as many as 27.1 points (SE=4.3) lower for learners from impoverished backgrounds as characterized by a lack of basic possessions or educationally qualified parents.

The Nguni learner-level model indicates that the variance component for the Nguni grouping consists of a larger variance within schools (6 701.18) than between schools (2 054.24). This learner-level pattern confirms previous discussions of explained variance for the null model, where variance at learner-level in the null model is also more pronounced than at school-level.

Preceded by the model notation, Table 8.17 provides results for the Nguni learner- and school-level model once classroom- and school-level variables are added to the model:

LEVEL 1 MODEL (bold: group-mean centering; bold italic: grand-mean centering)

$$ASRREA01 = \beta_0 + \beta_1(ITAGE) + \beta_2(ITSEX) + \beta_3(TIMEL) + \beta_4(OPPUSEL) + \beta_5(TIMEPAR) + \beta_6(OPPPAR) + \beta_7(SOCLP) + \beta_8(MISSLORP) + r$$

LEVEL 2 MODEL (bold italic: grand-mean centering)

$$\beta_0 = \gamma_{00} + \gamma_{01}(MSOCLP) + \gamma_{02}(QUALT) + \gamma_{03}(TIMET) + \gamma_{04}(OPPUSET) + \gamma_{05}(QUALEDS) + \gamma_{06}(TIMES) + \gamma_{07}(OPPORS) + \gamma_{08}(MISSTORS) + u_0$$

$$\beta_1 = \gamma_{10}$$

$$\beta_2 = \gamma_{20}$$

$$\beta_3 = \gamma_{30}$$

$$\beta_4 = \gamma_{40}$$

$$\beta_5 = \gamma_{50}$$

$$\beta_6 = \gamma_{60}$$

$$\beta_7 = \gamma_{70}$$

$$\beta_8 = \gamma_{80}$$

Table 8.17: Nguni Learner- and School-Level Model Results

Factor Name	Fixed Effect	Coefficient	Standard Error	P-Value
	Intercept	364.29	32.58	0.00
School and Classroom-Level				
MSOCLP	School socio-economic status	13.35	12.14	0.27
QUALT	Teacher quality	12.21	9.89	0.21
TIMET	Teacher time spent on reading in class	-0.53	5.88	0.92
OPPUSET	Reading opportunity created by teacher	-15.00	8.06	0.06
QUALEDS	School educational quality	-0.32	5.17	0.95
TIMES	School time spent reading	8.46	5.60	0.13
OPPORS	Reading opportunity created by school	-0.01	4.60	0.99
Learner-Level				
ITAGE	Learner age	-3.91	2.43	0.12
ITSEX	Learner sex	-30.98	4.36	0.00
TIMEL	Learner time spent reading	-11.40	2.23	0.00
OPPUSEL	Reading opportunity used by learner	14.50	2.05	0.00
TIMEPAR	Reading time created by parent	1.84	1.87	0.32
OPPAR	Reading opportunity created by parent	-4.42	2.62	0.09
SOCLP	Learner and parent social background	1.95	2.80	0.50

In adding classroom- and school-level variables to the Nguni model, none of these factors were found to have discernible associations. Significant factors that influence reading achievement for this group of learners remain at the learner-level, with learner *sex, time spent reading* and *opportunities used to read* being factors of significance. When school-level variables are added to the model, the associations are largely unchanged. Boys still achieve 31.0 points (SE=4.4) lower in average achievement than girls. Nguni learners who do not spend *time reading* achieve on average 11.4 points (SE=2.2) lower, and *opportunities used by learners to read* increases reading achievement scores to 14.5 points (SE=2.1).

For the learner-level model alone, learner *social background* was of significance in influencing average reading achievement scores. As indicated by Table 8.17 (above), learners from impoverished backgrounds are likely to have lower reading achievement scores by as many as 27 points. Yet, with the addition of the school-level variables to the Nguni model, the influence of the learner's social background is diminished and of non-significance at 0.50.

Of interest is also the indiscernible effect of the school's socio-economic status on reading achievement (p=0.27) in the Nguni model. This artifact could be explained by the reasoning that there may be no Nguni schools of higher socio-economic status, therefore the effect of resources and socio-economic status on learner achievement cannot be detected in the current data. While the availability of resources and higher socio-economic status is associated with the Afrikaans and English sector, this factor may not yet be as pronounced for learners from the Nguni grouping. Socio-economic factor results for the Nguni language grouping models are surprising in light of expectations that the factor would be significant. It might be the situation for this data because of large variance and the nature of the effect of socio-economic status being conflated by other factors.

Despite the statistical nonsignificance of socio-economic status for the Nguni model, at this point a useful distinction should be made between statistical significance and educational significance. Whilst the former designates

indicators that flag numerically significant relationships in data, the latter points to those factors that are of importance within the educational landscape based on interpretation from a specialist and practitioner point of view. Thus, whilst data may fail to show statistical significance, measured factors or relationships between variables may still be of educational significance.

That the addition of school-level variables to the Nguni model apparently contributes no significant factors to the model can be supported with evidence from the percentage of variance explained. Table 8.18 shows the differences in variance for the Nguni learner-level model only and the learner- and school-level models:

Table 8.18: Nguni Model Variance Components without and with School-Level Variables

	Nguni Learner-Level Model Only	**Nguni Learner- and School-Level Model**
Variance between schools	2 054.24	1 977.38
Variance within schools	6 701.18	6 700.95

The addition of the school-level variables that have been added to the Nguni level model explains less than 1% of variance found for this grouping of learners.

8.5. RESULTS FOR THE SOTHO MODEL

The Sotho language grouping comprises Grade 5 learners who completed the PIRLS 2006 assessment in Sesotho, Setswana and Sepedi. A total number of 3 363 Grade 5 learners constitute the Sotho language grouping with an average PIRLS 2006 achievement of 267.1 (SE=5.2%). Amongst the African language groups in the sample, the Sesotho and Setswana learners achieved the highest average scores in the PIRLS 2006 assessment of 288.6 (SE=7.6) and 288.1 (SE=12.1) respectively.

The null model for the Sotho language grouping resulted in the following estimated variance components:

Table 8.19: Estimation of the Variance Components in the Sotho Null Model

Variables	Estimate	SE
Grand mean	270.3	5.9
Variance components:		
School-level	2 115.8	
Learner-level	7 069.6	

For the Sotho null model, variance estimates at learner-level are much larger than variance found at school-level. The implication of this learner-level variance than school-level variance is the same in the Nguni model, that is South Africa has a noteworthy problem in terms of its learner diversity dominating school variability, specifically for African language learners, thereby making effective intervention with these already struggling learners considerably more difficult in schools with very diverse learner scores. For the purposes of this study, the Sotho language group was made up of learners from Sepedi, Sesotho and Setswana backgrounds. While these groups share linguistic similarities, the null model estimates confirm that great variance exists within learners despite their linguistic similarities.

Two Sotho models were generated, the first including only learner-level factors, the second model including learner- and school-level factors. Table 8.20 provides results for the Sotho learner-level model, preceded by the model's notation:

LEVEL 1 MODEL (bold: group-mean centering; bold italic: grand-mean centering)

$$ASRREA01 = \beta_0 + \beta_1(ITAGE) + \beta_2(ITSEX) + \beta_3(TIMEL) + \beta_4(OPPUSEL) + \beta_5(TIMEPAR) + \beta_6(OPPPAR) + \beta_7(SOCLP) + \beta_8(MISSLORP) + r$$

LEVEL 2 MODEL (bold italic: grand-mean centering)

$$\beta_0 = \gamma_{00} + u_0$$
$$\beta_1 = \gamma_{10}$$
$$\beta_2 = \gamma_{20}$$
$$\beta_3 = \gamma_{30}$$
$$\beta_4 = \gamma_{40}$$
$$\beta_5 = \gamma_{50}$$
$$\beta_6 = \gamma_{60}$$
$$\beta_7 = \gamma_{70}$$
$$\beta_8 = \gamma_{80}$$

Table 8.20: Sotho Learner-Level Model Results

Factor Name	Fixed Effect	Coefficient	Standard Error	P-Value
	Intercept	479.52	32.74	0.00
Learner-Level				
ITAGE	Learner age	-11.61	2.48	0.00
ITSEX	Learner sex	-24.60	4.04	0.00
TIMEL	Learner time spent reading	-8.00	3.00	0.01
OPPUSEL	Reading opportunity used by learner	13.00	2.15	0.00
TIMEPAR	Reading time created by parent	1.47	2.40	0.54
OPPAR	Reading opportunity created by parent	-8.06	2.32	0.00
SOCLP	Learner and parent social background	3.04	2.75	0.27

Table 8.20 (above) indicates statistically significant results for the Sotho learner-level model for all the variables that pertain to the learner directly. In this model, learner *age* is linked to lower average reading achievement by 11.6 points (SE=2.5) for each additional year increase of Grade 5 learner age. Consistent with patterns in other language groupings, boys in the Sotho model have significantly lower reading achievement scores than girls, by as much as 24.6 points (SE=4.0). The less *time learners spend on reading and reading related activities*, the lower the average reading achievement score is likely to be, by as many as 8 points (SE=3.0). *Reading opportunities used by learners* have a

positive effect on reading achievement scores, with 13 points (SE=2.2) higher averages where learners make use of opportunities to read.

As in the Nguni model, there is an interaction observed between these two factors, where the increase in scores for time spent on reading cannot be separated from the decrease in scores for learner opportunities used to read.

Parental variables of significance in the Sotho model pertain mainly to *parents' creation of opportunities for children to read.* Where parents fail to create these reading opportunities for the child, reading achievement scores are substantially lower by 8.06 points (SE=2.3).

The Sotho learner-level model shows that the *social background* factors associated at the learner-level are not associated with reading achievement scores. A similar explanation as that offered for the Nguni model could apply here too, where the effect of social background in the Sotho model cannot be suitably differentiated due to the absence in most cases of proxy measures such as possessions at home or parental qualifications.

The Sotho learner- and school-level model notation and Table 8.21 report the Sotho level model with the addition of classroom- and school-level variables:

LEVEL 1 MODEL (bold: group-mean centering; bold italic: grand-mean centering)

$$ASRREA01 = \beta_0 + \beta_1(ITAGE) + \beta_2(ITSEX) + \beta_3(TIMEL) + \beta_4(OPPUSEL) + \beta_5(TIMEPAR) + \beta_6(OPPPAR) + \beta_7(SOCLP) + \beta_8(MISSLORP) + r$$

LEVEL 2 MODEL (bold italic: grand-mean centering)

$$\beta_0 = \gamma_{00} + \gamma_{01}(MSOCLP) + \gamma_{02}(QUALT) + \gamma_{03}(TIMET) + \gamma_{04}(OPPUSET) + \gamma_{05}(QUALEDS) + \gamma_{06}(TIMES) + \gamma_{07}(OPPORS) + \gamma_{08}(MISSTORS) + u_0$$

$$\beta_1 = \gamma_{10}$$

$$\beta_2 = \gamma_{20}$$

$$\beta_3 = \gamma_{30}$$

$$\beta_4 = \gamma_{40}$$

$$\beta_5 = \gamma_{50}$$

$$\beta_6 = \gamma_{60}$$

$$\beta_7 = \gamma_{70}$$

$$\beta_8 = \gamma_{80}$$

Table 8.21: Sotho Learner and School-Level Model Results

Factor Name	Fixed Effect	Coefficient	Standard Error	P-Value
	Intercept	487.02	35.81	0.00
School and Classroom-Level				
MSOCLP	School socio economic status	8.82	25.57	0.73
QUALT	Teacher quality	10.16	7.69	0.19
TIMET	Teacher time spent on reading in class	-1.77	7.53	0.81
OPPUSET	Reading opportunity created by teacher	-16.21	7.50	0.03
QUALEDS	School educational quality	8.06	5.41	0.14
TIMES	School time spent reading	10.15	5.40	0.06
OPPORS	Reading opportunity created by school	-4.46	5.13	0.39
Learner-Level				
ITAGE	Learner age	-11.37	2.50	0.00
ITSEX	Learner sex	-24.52	4.05	0.00
TIMEL	Learner time spent reading	-8.15	3.00	0.01
OPPUSEL	Reading opportunity used by learner	12.95	2.14	0.00
TIMEPAR	Reading time created by parent	1.43	2.40	0.55
OPPAR	Reading opportunity created by parent	-8.08	2.30	0.00
SOCLP	Learner and parent social background	2.93	2.72	0.28

After the addition of school-level variables to the Sotho model, only some variables found at learner-level were of statistical significance. Greater age for Sotho learners at Grade 5 level is associated with average reading achievement scores down by 11.4 points (SE=2.5) per year, and boys have lower average reading achievement scores compared to girls, by as many as 24.5 points (SE=4.1). As with the lone-standing Sotho learner-level model, *time learners spend on reading* and *opportunities used to read* significantly affects reading achievement scores – less time spent on reading links to 8.2 points (SE=3.0) lower average reading achievement scores. *Opportunities used to read* have higher reading scores by 13.0 points (SE=2.1).

Table 8.22 reports the differences in variance for the Sotho learner-level model only and the learner and school-level model:

Table 8.22: Sotho Model Variance Components without and with School-Level Variables

	Sotho Learner-Level Model Only	Sotho Learner- and School-Level Model
Variance between schools	1 880.12	1 651.85
Variance within schools	6 535.98	6 535.27

Table 8.22 confirms that the addition of the school-level variables within the Sotho learner-level model explains very little of the variation.

8.6. RESULTS FOR THE TSHIVENDA MODEL

The Tshivenda grouping constitutes the smallest group of learners, with only 784 who completed the PIRLS 2006 assessment in Tshivenda. With PIRLS 2006 achievement scores of 262.1 (SE=15.0), the Tshivenda grouping's average reading achievement is comparable to that of the Nguni and Sotho groupings and substantially below that of the Afrikaans and English group of learners.

Due to the small sample size (only 20 Tshivenda schools in the national PIRLS 2006 sample), only a learner-level model will be presented for purposes of

analyzing the Tshivenda data. The null model for the Sotho language grouping resulted in the following estimated variance components:

Table 8.23: Estimation of the Variance Components in the Sotho Null Model

Variables	Estimate	SE
Grand mean	265.8	13.1
Variance components:		
School-level	1 231.8	
Learner-level	7 665.3	

The Tshivenda null model replicates results and implications that were found for the Nguni and Sotho null models, namely that variance estimates at learner-level are much larger than variance found at school-level.

Table 8.24 provides results of the Tshivenda learner-level model on aspects of learner *age, sex, learner and parent time spent on reading, learner opportunities used to read, parent opportunities created to read* and *social background*.

LEVEL 1 MODEL (bold: group-mean centering; bold italic: grand-mean centering)

$$ASRREA01 = \beta_0 + \beta_1(\textbf{\textit{ITAGE}}) + \beta_2(\textbf{\textit{ITSEX}}) + \beta_3(\textbf{\textit{TIMEL}}) + \beta_4(\textbf{\textit{OPPUSEL}}) + \beta_5(\textbf{\textit{TIMEPAR}}) + \beta_6(\textbf{\textit{OPPPAR}}) + \beta_7(\textbf{\textit{SOCLF}}) + \beta_8(\textbf{\textit{MISSLORF}}) + r$$

LEVEL 2 MODEL (bold italic: grand-mean centering)

$$\beta_0 = \gamma_{00}$$
$$\beta_1 = \gamma_{10}$$
$$\beta_2 = \gamma_{20}$$
$$\beta_3 = \gamma_{30}$$
$$\beta_4 = \gamma_{40}$$
$$\beta_5 = \gamma_{50}$$
$$\beta_6 = \gamma_{60}$$
$$\beta_7 = \gamma_{70}$$
$$\beta_8 = \gamma_{80}$$

Table 8.24: Tshivenda Learner-Level Model Results

Factor Name	Fixed Effect	Coefficient	Standard Error	P-Value
	Intercept	259.37	11.04	0.00
Learner-Level				
ITAGE	Learner age	-26.21	7.92	0.00
ITSEX	Learner sex	-17.50	10.50	0.10
TIMEL	Learner time spent reading	-11.01	6.26	0.08
OPPUSEL	Reading opportunity used by learner	16.32	4.48	0.00
TIMEPAR	Reading time created by parent	1.20	4.90	0.80
OPPAR	Reading opportunity created by parent	-8.22	6.50	0.20
SOCLP	Learner and parent social background	6.30	7.02	0.38

Of statistical significance for the Tshivenda model is learner *age* and *opportunities used by learners to read.* Average reading achievement scores are 26.2 points (SE=7.9) lower for each additional one year increase of age for a Tshivenda learner at Grade 5 level. In terms of opportunities used by learners to read, reading achievement scores are substantially higher by 16.3 points (SE=4.5) when these opportunities are reported by learners.

Variance components for the Tshivenda learner-level model reveal that the variance within schools (6 915.50) is larger than that between schools (928.99). Due to the small sample size of this group, these results should be interpreted with caution, especially in light of the addition of the school socio-economic indicator to the model still explaining less than 1% of the variance (i.e. insufficient variation in schools).

8.7. SUMMARY OF RESULTS

Chapter 8 provided results for the HLM models, first for the null (or empty) models, then with variables that were created with standardized scores and included at both learner- and school-level. Results of an overall model were provided, followed by the results for each language grouping separately, first

providing results for the learner-level only, then for both learner- and school-levels.

Apart from model results for each language grouping, explained variance was presented for each language grouping in terms of the null model, the learner-level and learner- and school-level models. Variance patterns for the overall model suggests that as much as 36% of variance can be explained with the addition of language to the model.

Variance patterns for the Afrikaans and English models confirmed that the percentage of explained variance for these groups was consistently greater at school-level. This implies that the effect of school-level variables is more pronounced for these learners and may explain more of the variance in reading achievement.

A reversed pattern of variance was found for the Nguni, Sotho and Tshivenda groupings, with much more pronounced variance found at learner-level. Such a pattern confirms that much more variance in reading achievement is explained at learner-level for these groups of learners, thereby emphasizing the great diversity of the African language learners' profiles and the complexity with which any interventions or strategies should be implemented to take this variation at learner-level effectively into account.

Furthermore, there is less than 1% of explained variance at school-level for the African languages (i.e. Nguni, Sotho and Tshivenda) in this study. This lack of explained variance suggests that perhaps more explanation can be expected when languages are to be treated separately.

The conclusion that can be drawn from the results of Figure 8.7 is that exploratory methods may be more appropriate when working with African languages, since in this study the confirmatory approach only worked for Afrikaans and English learners, who all attend schools that follow a mainly western tradition. It may well have occurred that, due to the use of confirmatory methods, important variables that could have explained more for the African

languages, have inevitably been excluded from the models. Relevant sources of variation may therefore not be represented in the model and might have been overlooked.

Table 8.25 highlights statistically significant coefficients for each of the models:

Table 8.25: Summary of Model Results in the Presence of Other Coefficients

Fixed Effect	Overall	Afrikaans	English	Nguni	Sotho	Tshivenda
School and Classroom-Level						
School socio-economic status	69.10	87.60	71.05	-	-	-
Afrikaans	-10.93	-	-	-	-	-
Nguni	-70.90	-	-	-	-	-
Sotho	-68.00	-	-	-	-	-
Tshivenda	-73.51	-	-	-	-	-
Teacher quality	-	-	-	-	-	-
Teacher time spent on reading in class	-	-	-	-	-	-
Reading opportunity created by teacher	-14.12	-	-	-	-	-
School educational quality	-	-	-	-	-	-
School time spent reading	-		-	-	-	-
Reading opportunity created by school	-		-	-	-	-
Learner-Level						
Learner age	-8.76	-16.49	-31.70	-	-11.37	-21.81
Learner sex	-27.50	-25.48	-23.53	-30.98	-24.52	-
Learner time spent reading	-9.55	-	-	-11.40	-8.15	-
Reading opportunity used by learner	10.50	-	-	14.50	12.95	14.55
Reading time created by parent	-	-	-	-	-	-
Reading opportunity created by parent	-8.32	-10.05	-11.44	-	-8.08	-
Learner and parent social background	6.30	10.02	11.82	-	-	-

The statistical significance of the school socio-economic variable for the overall model, the Afrikaans and English models is noted. The apparent absence of socio-economic effects for the African languages may be explained by an absence of variance between schools for the African language groupings, for whom very few well-resourced schools were available in the South African PIRLS 2006 sample.

The overall model utilized the English average reading achievement scores as the arbitrary reference intercept against which the achievement of all other language groupings could be compared. Although a decrease in reading score is shown for Afrikaans when compared to English as the control language, this decrease appears minor. Of clear significance, however, was the decrease in average reading achievement for each of the African language groupings when English was used as control. These results provide statistical evidence that African language achievement is lower when compared to the Afrikaans and English groups of Grade 5 learners.

For the overall model, reading opportunities created by the teacher are highlighted as the only factor that affects reading achievement significantly. In the separate language grouping models, all the significant factors are found at learner-level. Learner age and sex appear consistently as determining factors for reading achievement, with the exception of the Nguni group where age was not significant and for the Tshivenda group where sex was not a significant factor in achievement.

Learner time spent reading and opportunities used to read were found to be of significance in the overall model and the Nguni, Sotho and Tshivenda models. From these results one could deduce that among learners from African language groupings contrasting achievements, reading habits, behaviour and motivation are linked to the learners themselves rather than school factors.

A different pattern is observed for the results of the overall model, Afrikaans, English and Sotho models. Results from these models suggest that learner reading achievement is substantially more influenced by the role of the parents. For these models, learners whose parents create opportunities for children to read have higher scores for reading achievement. This pattern is in contrast to the African language models where learners' reading achievement seems influenced by their own time spent and opportunities used for reading. The results for the overall, Afrikaans, English and Sotho models would suggest that these learners' reading achievement are partly influenced and mediated by the role of the parents.

In Chapter 1, the diminished role of parents, specifically in Black communities, was mentioned. The role of HIV-Aids and its consequences on the increased occurrence of child-headed households in South Africa was described as a factor with which the South African educational system will likely have to contend in future. This social background may explain the nonsignificance of parental opportunities created and time spent on reading in the Nguni and Tshivenda models. Yet the opposite may be true for the Sotho model, where results of the model provide evidence for the significant importance of parental involvement in reading for these children. Parental involvement may also explain why Sotho learners achieved on average the highest in the PIRLS 2006 assessment of all the African languages. Despite these plausible interpretations, the results of the overall model, the Afrikaans, English and Sotho models emphasize and provide some evidence of the importance of parental involvement in promoting children's reading achievement.

Lastly, some interaction between parental time spent on reading and the opportunities created by parents for reading were repeatedly supported in a number of results with contrasting signs for models. While a theoretical distinction was made between these two factors for the purposes of this study, and in line with Creemers' Model of Educational Effectiveness, model results point to the possibility that these two factors may be related in reality and may result in the same parental behaviour either in spending time reading or creating opportunities for the child to read. It is therefore not possible to separate the effects of time spent on reading and opportunity created to read in the results of these models. This comment cautions against any associations of scores with time spent on reading, since non-significant coefficients for this factor cannot be interpreted in isolation and must be interpreted in conjunction with the opportunities created for reading and other realities in the model.

CHAPTER 9: CONCLUSIONS AND RECOMMENDATIONS

"When I got my library card, that was when my life began."

Rita Mae Brown

This study proposed to identify, illuminate and explain relationships between some major explanatory factors and successful reading at Grade 5 level in South African primary schools. The potential significance of this study is that factors associated with reading literacy achievement can be illuminated and understood against objective measures of achievement in each of the 11 official languages.

South Africa's contextual background includes many problematic social and economic issues against which the National and Provincial Departments of Education are expected to provide quality education. Some prominent issues the country faces, such as learner drop-out and failure rates, the impact of HIV/AIDS, and the prevalence of poverty, pervade the country's profile. These issues, as outlined in Chapter 1, were done so not in an attempt to find answers in the current study, but rather to sketch a contextual background against which many learners in the South African schooling system are expected to perform and progress from one grade to the next.

This study made use of data from the Progress in International Reading Literacy Study 2006 (PIRLS 2006), in which a total of 40 countries and 45 education systems (e.g. Belgium – Flemish and Belgium - French) participated. PIRLS 2006 required the assessment of learners who have had four years of schooling, and for most countries this requirement translated to Grade 4 learners. The South African PIRLS 2006 study assessed a first population of Grade 4 learners in uniformity with other countries, but also included a second population of Grade 5 learners as a national option within the study. Chapter 6 provided detailed results for Grade 5 learner performance on the PIRLS 2006 assessment and illustrated evidence that South Africa achieved the lowest

Grade 4 score of the 45 participating education systems and Grade 5 lower from all other countries' Grade 4 achievement.

In addition to providing overall achievement results for South African Grade 5 learners, Chapter 6 also provided achievement results per language. The inclusion of language in this study should not create the impression with the reader that the study was linguistic in nature. Instead, language provided an important basis on which to separate learners to assist with multi-level analyses and simplified the data of a study that was in essence repeated 11 times over to include all official South African languages.

The PIRLS 2006 reading assessment was administered to a sample of 14 657 Grade 5 learners in aggregated selected schools across all 11 official languages. Of importance in this study is to note that results for each language referred to the language of the test, not home language. The language of the test was the language that should have coincided with the language in which the learner had been receiving instruction for the first four years of schooling, and may have been different from the learner's home language.

This PhD study takes the form of a secondary analysis of the South African PIRLS 2006 data, thus utilizing achievement data as obtained from a nationally representative sample within the context of an internationally comparative study. Of significance in this study is that data was available for almost 15 000 Grade 5 learners taken from a representative national sample. The available data not only pertains to achievement data, but also contextual data on learner, home, classroom and school-level. Such a rich source of data allowed multi-level analyses.

This final chapter summarizes:

- The research study, its aims and objectives (section 9.1)
- The research questions of this study and evidence in support of answering these questions (section 9.2)
- Reflections on the conceptual framework (section 9.3)

- Methodological reflections (section 9.4) and limitations of the study (section 9.5)
- Conclusions and recommendations (section 9.6).

9.1. SUMMARY OF THE RESEARCH APPROACH

This study proposed to identify, illuminate and explain relationships between some major explanatory factors and successful reading at Grade 5 level in South African primary schools by making use of the PIRLS 2006 achievement and contextual data. With 11 official languages, current educational policy in South Africa advocates that learners in Grade 1 to 3 are taught in their mother tongue. When these learners progress to Grade 4, the language of learning and teaching changes to a second language, which in most cases is English. At this developmental stage, learners are also expected to advance from learning to read to a stage where they can use reading in order to learn. Using learners' achievement scores as obtained in the PIRLS 2006 assessment when tested in their language of learning, this study aimed in large part to investigate whether instruction in one's own native language contributes significantly to the relationship of explanatory factors with associated reading performance.

For the purposes of answering the research questions posed by this study, Hierarchical Linear Modelling (HLM), also known as Multi Level Modelling, was used. The aim of these analyses was to establish the relationships between one or more explanatory variables (in this case obtained from suitable items in the contextual questionnaires on learner- and school-level) and the outcome variables (reading achievement scores for the different language groups). Despite the availability of data for all 11 official languages, a decision was taken to aggregate achievement data into five language groupings, namely Afrikaans, English, Nguni, Sotho and Tshivenda. Based on linguistic similarities, it was hoped that this re-grouping of data would aid in the analyses and model-building to illuminate any important factors associated with reading achievement per language grouping.

The analysis of the PIRLS 2006 achievement and questionnaire data followed a confirmatory, not exploratory, approach. For purposes of using a confirmatory approach, Creemers' Model of Educational Effectiveness was used as theoretical point of departure, where PIRLS 2006 questionnaire items at learner- and school-level were matched and fitted against the framework. The implication of this approach was that, instead of using all variables available to the researcher from the different questionnaires, only a selection of variables that were expected on the basis of the model to be related to reading literacy achievement was used for analytical purposes. In this way, the study was not guided by the available data alone. Instead existing research into what is known about explanatory factors that are likely to influence learner achievement was utilized in order to have a theory to guide the analysis of data.

9.2. SUMMARY OF RESEARCH QUESTIONS AND RESULTS

This study aimed to investigate the factors associated with reading performance in the learners' language of learning, as measured in all South Africa's 11 official languages. The main research question that guided this PhD study was:

What are the factors that could be associated with Grade 5 learner performance in reading literacy in South Africa?

Measurements obtained from the PIRLS 2006 project were used in an attempt to answer this question. Factors emanating from contextual questionnaires of Grade 5 learners, their home environment, their schools and classrooms, were identified in conjunction with learners' test scores on the PIRLS 2006 achievement tests. In order to answer the main research question, it was divided into five sub-questions, namely:

1. What was the Grade 5 learner performance on the PIRLS 2006 assessment?
2. What is the extent of variation across the language groupings in Grade 5 learners' reading literacy performance?

3. What factors related to the learners' background (for example motivation to read, language skills and home environment) affect performance in reading literacy?
4. To what extent does the school and classroom environment affect reading literacy performance?
5. How do these relationships between factors differ or remain constant across the language groupings in South Africa?

The following section elaborates on this study's attempts to find answers to each of these questions.

9.2.1. What was the Grade 5 Learner Performance on the PIRLS 2006 Assessment?

The South African Grade 5 learners attained very low reading achievement scores, especially in comparison with their Grade 4 counterparts internationally. South African Grade 5 learners achieved on average only 302 (SE=5.6) points (see Chapter 6). The poor reading achievement of Grade 5 learners was reflected in equally poor achievement scores for Grade 4 learners, who achieved on average 253 points (SE=4.6). Average achievement for both these grades was well below the fixed international reference average of 500 points. Closest to South Africa's mean reading achievement score was Morocco, the only other African country that participated in PIRLS 2006, with a Grade 4 average of 323 points (SE=5.9).

Achievement was also presented in terms of learners' abilities to reach the internationally set Low, Intermediate, High and Advanced benchmarks (as discussed in Chapter 6). Nationally, as little as 6% of learners were able to reach or exceed the High International Benchmark for Grade 5 competence, in comparison to 41% internationally. Moreover, as many as 78% of South African Grade 5 learners were unable to reach the Low International Benchmark at all, in contrast to only 9% of learners internationally. International patterns show a substantial spread of achievement across each of the benchmarks, yet the South African pattern painted a very bleak picture of devastating

underachievement, as also echoed by the South African Grade 4 report (Howie et al, 2009).

South Africa's poor learner performance in the PIRLS 2006 assessment is mirrored by equally poor performance in other international and national studies. The SACMEQ II report (Moloi and Strauss, 2005) indicates that only 12.2% of Grade 6 learners in South Africa have pre-reading skills at a very basic level. As little as 16.0% of Grade 6 learners have skills to read for meaning, while only 6.6% of learners were able to employ critical reading skills. These results concur with the national 2003 Systemic Evaluation (SE) results of 52 000 Grade learners showed a national average of only 39% for literacy. The difficulty of Grade 5 learners to respond to written responses in the PIRLS 2006 assessment is discussed in following sections. These difficulties were also of concern to Grade 3 learners who were assessed in the Systemic Evaluation, as learners seemed to have great difficulty in this study too in producing their own written responses.

Learners who wrote the PIRLS 2006 test in Afrikaans (n=1 678) achieved the highest scores, followed by learners who wrote the test in English (n=2 793). A substantial drop in achievement is illustrated for learners who wrote the test in isiNdebele (n=798), isiXhosa (n=1 470), Sepedi (n=1 349) and Siswati (n=1 147). Learners who wrote the test in isiZulu (n=1 733), Sesotho (n=959), Setswana (n=1 055), Tshivenda (n=784) and Xitsonga (n=891) achieved better scores than their counterparts representing the other African languages. Results per language therefore indicated that learners who wrote the assessment in Afrikaans and English performed substantially better than learners who completed the assessment in any of the African languages (see Chapter 6).

9.2.2. What is the Extent of Variation across the Language Groupings in Grade 5 Learners' Reading Literacy Performance?

The PIRLS 2006 data was reduced and recoded into five language groupings, namely Afrikaans, English and Tshivenda as lone-standing language groupings, followed by the Nguni languages (consisting of isiNdebele, isiXhosa, isiZulu, Siswati and Xitsonga), and the Sotho languages (consisting of Sepedi, Sesotho and Setswana). Average achievement scores for these language groupings, (as discussed in Chapter 7), are provided in Table 9.1:

Table 9.1: Average Grade 5 Achievement Score per Language Grouping

Language Grouping	N	Average Achievement Score	SE
Afrikaans	1 678	415.7	12.0
English	2 793	398.0	17.1
Nguni	6 039	243.3	4.4
Sotho	3 363	267.1	5.2
Tshivenda	784	262.1	15.0

The Grade 5 learner performance varied greatly across the five language groupings (refer to Chapter 7 for additional tables and information). The difference in performance can be most strongly observed between the European-based language groupings (Afrikaans and English) and the African-based language groupings. There was as much as a 173 point difference between the highest performing group (i.e. Afrikaans) and the lowest performing group (i.e. Nguni). In the South African context these language groupings may be a proxy for socio-economic factors.

Due to the differences in average achievement scores between language groupings, the assumption was that variation would exist between different groupings of learners, particularly by language. The extent of variation in the reading scores within classrooms and schools is also reflected by the amount of variance estimated (as discussed in Chapter 7). The greatest variance found lies within the English grouping for reasons described earlier (see Chapter 7). Table 9.2 indicates the range of variances applicable within language groupings:

Table 9.2: Variance Across Language Groupings

Language Grouping	N	Un-weighted Variance	Weighted Variance (Total Student Weight)
Afrikaans	1 678	16 052.2	17 027.5
English	2 793	21 925. 7	24 012.1
Nguni	6 039	8 813.2	9 386.4
Sotho	3 363	8 916.9	9 021.1
Tshivenda	784	9 761.4	9 291.6

This is the first study of its kind nationally to be able to illustrate the vast variation in reading achievement scores. Previous Mathematics studies (for example, Howie, 2002) have also found that South African classrooms are characterized by large variation, rendering any generalizations very difficult with diverse groups of learners. The most homogenous of the five language groupings was Tshivenda. Even Afrikaans represents a heterogeneous grouping of Afrikaans first language speakers and Coloured learners who speak Afrikaans as a first language and perhaps includes learners from other communities who speak Afrikaans as a second language. This same pattern is of relevance to the other language groupings as well, where substantial heterogeneity may exist amongst learners within groups.

9.2.3. What Factors Related to the Learner's Background Affect Performance in Reading Literacy?

Studies on the factors associated with learner performance, using PIRLS 2006 data, have been conducted by Frank and Rosen (2008) in Sweden, Geske and Ozola (2008) in Latvia and van Daal, Begnum, Solheim and Ader (2008) in the Nordic countries. This study is distinct from these other studies in that it sought to investigate explanatory factors within the learners' background, for example motivation to read, language skills and home environment, that affect performance in reading literacy, and the manner in which these relationships between factors differ or remain constant for the five language groupings in South Africa. For the purposes of answering these questions, Hierarchical Linear Modelling (HLM) was used to determine the effect of a number of variables at learner-level and at school-level on reading achievement as

response variable, while controlling for language. Furthermore, the theoretical underpinning of an adapted Creemers' Model (see Chapter 5) provided the basis for the selection of the variables for the HLM analyses.

The results were presented in Chapter 8. Table 9.3 summarizes results on learner-level for the overall model and for each of the language groupings separately. Entries in the table were characterized by statistical significance at p=0.01 or 1% cut off.

Table 9.3: Summary of Learner-level Model Results with Significant Coefficients

Fixed Effect	Overall	Afrikaans	English	Nguni	Sotho	Tshivenda
Learner-level						
Learner age	-8.76	-16.49	-31.70		-11.37	-21.81
Learner sex	-27.50	-25.48	-23.53	-30.98	-24.52	-
Learner time spent reading	-9.55	-	-	-11.40	-8.15	-
Reading opportunity used by learner	10.50	-	-	14.50	12.95	14.55
Reading time created by parent	-	-	-	-	-	-
Reading opportunity created by parent	-8.32	-10.05	-11.44	-	-8.08	-
Learner and parent social background	6.30	10.02	11.82	-	-	-

Note: Only statistically significant coefficients (p=<0.01) are presented in the table.

All the learner-level variables included in the overall theoretical model were statistically significant for at least one language grouping in affecting Grade 5 learner performance in reading literacy. The exception was *reading time created by the parent. Learner age* and *learner sex* were statistically significant for all groupings, except Nguni for age and Tshivenda for sex.

For Afrikaans and English Grade 5 learners significant factors that affected reading literacy performance included *learner age, sex, reading opportunity created by the parent* and *learner- and parent social background*.

The Nguni grouping had three factors of significance at the learner-level, namely *learner sex, learners' time spent reading* and the *reading opportunity used by the learner*. For the Sotho grouping, *learner age, learner sex, learner time spent reading, reading opportunity used by learner* and *reading opportunity*

created by parents were significantly associated with reading performance. The Tshivenda grouping manifested significant factors for learner age and reading opportunity used by the learner.

Factors that were not statistically significant in the learner-level model included *learner time spent reading, reading opportunity used by learners* and *reading time created by parents* for the Afrikaans and English groupings. For the Nguni and Tshivenda groupings, no factors at parental level were of statistical significance. *Reading opportunity created by parents* was of only statistical significance for the Sotho grouping. While these factors proved to be of statistical nonsignificance in this study, their educational significance should not be discounted. It is possible that the factors are indirectly contributing to achievement via other factors found to be significant.

The significance of learner-level factors in this study is confirmed by the work of Pretorius and Machet (2004) in another smaller South African study that portrays the effectiveness of a literacy enrichment programme on learner-level and its discernable impact on primary school learners' literacy accomplishments. Of importance in the significance of so many learner-level factors on reading achievement across the overall- and language grouping models is the possibility for policymakers and educators to intervene effectively at learner-level. Any interventions or policy changes that are closely related to specific types of learners are more likely to result in change than changes to the school-level factors. If, for example, educators and policymakers are aware of the fact that boys in all cases perform significantly lower in reading than girls, any interventions can be tailored and developed with boys in mind. Similarly, if reading achievement is lower in each successive increasing age group amongst Grade 5 learners, policies of keeping learners in the same grades for consecutive years may prove to be ineffectual, and alternative ways of assisting older learners have to be considered.

9.2.4. To What Extent do the School and Classroom Environment Affect Reading Literacy Performance?

Table 9.4 provides results of significant factors for the overall South African school-level model and school-level models for each language grouping separately:

Table 9.4: Summary of Model Results with Significant Coefficients

Fixed Effect	Overall	Afrikaans	English	Nguni	Sotho	Tshivenda
School-level						
School socio-economic status	69.10	87.60	71.05	-	-	-
Afrikaans	-10.93	-	-	-	-	-
Nguni	-70.90	-	-	-	-	-
Sotho	-68.00	-	-	-	-	-
Tshivenda	-73.51	-	-	-	-	-
Teacher quality	-	-	-	-	-	-
Teacher time spent on reading in class	-	-	-	-	-	-
Reading opportunity created by teacher	-14.12	-	-	-	-	-
School educational quality	-	-	-	-	-	-
School time spent reading	-	-	-	-	-	-
Reading opportunity created by school	-	-	-	-	-	-

Note: Only statistically significant coefficients (p=<0.01) are provided in the table.

Results of this study (as indicated by Table 9.4) indicate that none of the teacher level variables (including that of teacher quality) were significant in the overall model, with the exception of *reading opportunity created by the teacher*. Where teachers fail to create such opportunities for learners, average reading achievement was 14.1 (SE=5.4) points lower.

The work of Lee, Zuze and Ross (2005) in their secondary analysis of the SACMEQ II data showed patterns of higher achievement in schools with more resources and higher quality teachers. Prinsloo and Stein's (2004) study of South African teachers, point out that an aspect of teacher quality is the teacher's ability to function in complex communicative environments in which the differences in children's literacy experiences result from how the teachers invent their activities around literacy differently, despite following the same 'broad' curriculum.

Chapter 8 elaborated on the provision in each model of a variable for school socio-economic status. This variable was created to convey the social background of the school by averaging indices of resources across the set of children in the school. The interpretation of the model now allows for explanations of teacher- and school-level *time spent on reading, opportunities created by the teacher and school for reading* and *the quality of teachers within a socio-economic context* that were accounted for in the model.

The overall model showed that, after taking account of *teacher and school time spent on reading*, *opportunities created for reading and teacher quality*, *school socio-economic status* was still associated with a 69.1 (SE=5.2) points higher average reading achievement. For separate Afrikaans and English groupings, *school socio-economic status* accounted for 87.6 and 71.1 points higher average reading achievement scores respectively.

The absence of socio-economic and other school-level effects for the African languages can perhaps be explained by minimal socio-economic variation between schools for the African language groupings. Few well-resourced schools from Black communities were available in the South African PIRLS 2006 sample. An alternative explanation for the lack of variance in African language groupings may also point to the inability of response options to items in the PIRLS 2006 contextual questionnaires to provide sufficient variation. A tradition of social desirability has the implication that learners, teachers and principals alike may tend to mainly select very positive response options, thereby rendering any observations of manifest variation nearly impossible.

With the absence of statistical significance for school-level factors for each of the separate language groupings, it also has to be borne in mind that with the particular use of Creemers' Model of Educational Effectiveness, there may be a number of relationships that could not be found or tested for the purposes of this study. It could be that no appropriate variables were identified under the relevant components in the conceptual framework. A decision was taken to follow a confirmatory approach in this study. While reasons for this decision are well documented (see Chapter 5), an exploratory and not confirmatory

approach to data analysis may be more appropriate in ascertaining relationships for African language groupings. Although several of the predicted components were not found to be of statistical significance at school-level in this study, this outcome does not mean that associations do not exist.

Despite the lack of detectable school-level factors for African language groupings, overall model results, and Afrikaans and English results nonetheless illustrate the effect of school socio-economic status as consistent with other research, which identifies socio-economic status as the dominant predictor of reading achievement.

9.2.5. How do these Relationships between Factors Differ or Remain Constant across the Language Groupings in South Africa?

Table 9.5 reflects on a summary of statistically significant results for the overall model and for models applied to each of the language groupings separately that were presented in Chapter 8:

Table 9.5: Summary of Model Results with Significant Coefficients

Fixed Effect	Overall	Afrikaans	English	Nguni	Sotho	Tshivenda
School and Classroom-Level						
School socio-economic status	69.10	87.60	71.05	-	-	-
Afrikaans	-10.93	-	-	-	-	-
Nguni	-70.90	-	-	-	-	-
Sotho	-68.00	-	-	-	-	-
Tshivenda	-73.51	-	-	-	-	-
Teacher quality	-	-	-	-	-	-
Teacher time spent on reading in class	-	-	-	-	-	-
Reading opportunity created by teacher	-14.12	-	-	-	-	-
School educational quality	-	-	-	-	-	-
School time spent reading	-	-	-	-	-	-
Reading opportunity created by school	-	-	-	-	-	-
Learner-level						
Learner age	-8.76	-16.49	-31.70	-	-11.37	-21.81
Learner sex	-27.50	-25.48	-23.53	-30.98	-24.52	-
Learner time spent	-9.55	-	-	-11.40	-8.15	-

reading						
Reading opportunity used by learner	10.50	-	-	14.50	12.95	14.55
Reading time created by parent	-	-	-	-	-	-
Reading opportunity created by parent	-8.32	-10.05	-11.44	-	-8.08	-
Learner and parent social background	6.30	10.02	11.82	-	-	-

Note: Only statistically significant coefficients (p=<0.01) are provided in the table.

Patterns of statistical significance between the Afrikaans and English language groupings were directly similar, with *school socio-economic status, learner age, learner sex, reading opportunity created by the parent* and *learner- and parent social background* having associations of statistical significance with reading literacy performance.

A much more varied picture emerges between the African language groupings, specifically at learner-level, where the Sotho grouping was the only one with a significant factor in the form of *reading opportunities created by parents*. While similarities between these groupings were observed for *reading opportunities used by learners* and *time spent reading by learners*, the effect of *learner age* and *learner sex* varied, with learner age not being of statistical significance for the Nguni grouping and learner sex not being of statistical significance for the Tshivenda grouping.

Of interest is that the results for this study showed no statistical significance for school-level factors associated with reading outcomes for any of the language groupings. Also of interest was the nonsignificance of school socio-economic status for the African language groupings (see Chapter 8 and explanations provided in this Chapter under 9.1.4).

The coefficients indicating the effect between *learner opportunities used to read* and *time spent reading* were of opposite sign, suggesting association with higher and lower reading scores respectively. It was therefore not possible to separate the effects of *time spent on reading* and *opportunity created to read* in

the results of these models (as discussed in Chapter 8). It is plausible that the interaction between these two factors occurs, and hence cautioned against making any interpretations of the significance of *time spent on reading*, require interpretation in conjunction with the *opportunities created for reading.*

9.3. REFLECTIONS ON THE CONCEPTUAL FRAMEWORK

In not only understanding the reasons for poor reading achievement, but also identifying those factors that can be associated with successful readers and those factors associated with readers at risk of failure, three contextual systems seem to be of major influence in reading achievement, namely the school, the home and the learners themselves.

Creemers' Comprehensive Model of Educational Effectiveness underpinned the conceptualization and design for this study, as it most closely supported preliminary ideas and appeared highly relevant to already existing reading achievement literature. Creemers' framework provided the basis for a comprehensive analytical model in this study's attempt to evaluate achievement across language groupings in the PIRLS 2006 South African data.

Creemers' model focuses on the explanation of learner outcomes by alterable educational factors, by discerning contrasting but connected levels of structure, for effectiveness in education. Higher levels provide conditions for lower level changes and educational outcomes are induced by the combined effects of levels. The model has four levels, namely the learner-level, classroom-level, the school-level and the context (or country) level. A detailed description of the various components was given in Chapter 3.

Table 9.6 (below) illustrates how components of quality, time and opportunity, as taken from Creemers' model, were populated with variables from the PIRLS 2006 contextual questionnaires. Justification for using the framework was given in Chapter 3. Table 9.6 further summarizes the statistically significant effects found in this study for the overall model and per language grouping separately. It confirms the statistically significant effects found in the overall, Afrikaans and

English models for school socio-economic status, followed by statistically significant effects found at school-level for the overall model. At learner-level, different significant factors as per language grouping are indicated (as discussed in detail in Chapter 8 and in explanations provided in this Chapter under 9.1.3).

Table 9.6: Factors of Reading Effectiveness and Statistically Significant Effects (adapted from Creemers, 1999)

Levels	Components of Quality, Time and Opportunity	PIRLS 2006 Explanatory Variables	Statistically significant effects					
			Overall	Afrikaans	English	Nguni	Sotho	Tshivenda
Context	Quality:	Demographics and resources (School SES)	x	x	x			
	Time:	Curriculum characteristics and policies						
	Opportunity:	Governance and organization of educational system						
School	Quality (educational):	School environment and resources Instructional activities and strategies	x					
	Quality: (organizational)	Governance and organization of educational system						
	Time:	Teacher training and preparation Home-school connection						
	Opportunity:	Curriculum characteristics and policies						
Classroom	Quality:	Demographics and resources Instructional materials and technology						
	Time:	Teacher training and preparation						
	Opportunity:	Classroom environment and structure Instructional strategies and activities Home-school connection	x					
Learner	Quality:	Learners' out-of-school activities	x	x	x	x	x	x
	Opportunities used:	Home-school connection	x	x	x			
	Motivation:	Activities fostering reading literacy	x	x	x		x	
	Social background:	Demographics and resources	x	x	x	x	x	x
		School environment and resources	x	x	x			
		Home resources	x	x	x			
	Basic skills/Higher order skills:	Language in the home						

It has to be kept in mind that not all of the variables from the contextual questionnaires were used in building the learner- and school-level models. Instead, only some variables were selected in accordance with the factors as outlined by Creemers. In this way, a theoretical point of departure served as justification for including and excluding variables into the model. Chapter 7 described the construction of the scales which were used at the learner- and school-level. Reference can be made to Chapter 7 for detailed descriptions and tables of variables that were included in the learner- and school-level models.

The use of Creemers' Model of Educational Effectiveness as conceptual framework in this study begs the following question: To what extent does the presupposed model capture the PIRLS 2006 data adequately? It can be argued that it was never the intention for the PIRLS 2006 data to fully capture Creemers' Model, since the model was not used here to broaden an understanding of school effectiveness. Nonetheless, it was used as theoretical point of departure for this study without the intent to be fully captured by the PIRLS 2006 data.

Based on model results (as discussed in Chapter 8) some surprising results emanated contrary to expectation. One such outcome was the statistical nonsignificance of school socio-economic status for the African language groupings. These results should not be interpreted as suggesting there is no socio-economic association with average reading performances for African language groupings at school-level. Instead, there may be a number of direct relationships that could not be found or tested given this study's data source and conceptual framework. For a number of Creemers' factors no appropriate variables could be identified under the relevant components in the conceptual framework (e.g. basic skills, variables that measure resources rather than opportunity, as described fully in Chapter 7). Although several of the predicted Creemers' components did not exhibit association in this, this outcome does not mean that the associations do not exist. It merely suggests that the predicted components are not directly affecting achievement in the current study.

Reflections on the conceptual framework used in this study and the study of PIRLS 2006 data to adequately mimic the components as specified by Creemers, invite another question: How should the model change to suit the South African landscape more adequately? Perhaps modifications should be explored rather than confirmed, since use of the South African PIRLS 2006 data source to capture the essence of Creemers' components often resulted in the elimination of or adaptation to factors.

Another model aspect where evidence may have been suppressed in the data and not adequately reflect the conceptual framework, was that the school and teacher was inseparable given the sampling of one class representing the school. The inseparability of the school and teacher could be mediated with the inclusion of more teacher or classroom data and invites the following question for consideration in future research: Could more than one classroom per school warrant changes of design, thereby improving the explanatory power of this model? For example, could data in future be selected from two or more classrooms per school, with fewer sampled schools, and if so, could the choice of such schools for a second classroom be random choices of schools that have been already stratified by some salient feature (e.g. school variability)?

In conclusion, Creemers' framework was used as it supported preliminary ideas about reading achievement most closely. However, although the presupposed model was apparently adequate for the overall, Afrikaans and English models and literature, the framework did not fit patterns found for the African languages, and may therefore suggest further changes to the framework to suit the South African landscape more adequately. It is my firm belief that suggested changes to a framework would have to include adjusted measures on aspects of teachers' beliefs about reading, its role and importance in the classroom and perceptions of adequate time spent on the activity in attempts to gauge the South African classroom environment.

9.4. METHODOLOGICAL REFLECTIONS

This study took the form of a secondary analysis of the South African PIRLS 2006 data. Some design issues needed to be kept in mind with the interpretation of results. In this section a number of considerations are discussed in relation to the PIRLS 2006 data and methodology employed in the study that may impact on the results:

9.4.1. The PIRLS 2006 Assessment Instruments and Contextual Questionnaires

As an international comparative study, the PIRLS 2006 data collection instruments consisted of reading achievement booklets comprising reading comprehension passages with accompanying questions in various formats. As part of assessing reading comprehension and understanding the contexts in which Grade 5 learners read, the assessment also included the administration of questionnaires to school principals, teachers, parents and learners.

As seen in the results, in some cases, learners experienced great difficulty in responding to the PIRLS 2006 reading passages. Some of these difficulties may have been associated with translation issues. In conversation with translators, it became clear that many of the African languages are regionally influenced. So, for example, is the Sepedi that is spoken in one region of the country different from the Sepedi that is spoken in another region, thereby rendering translations impossible to be reflective of each region. Despite this regional difference, the PIRLS 2006 South African data collection instruments reflected the accepted, standardized versions of all 11 official languages as far as possible in 2004. Of the PIRLS 2006 participating countries, South Africa proved to have the most complex situation by far in terms of the number of indigenous languages and their implementation as LOLT in schools. Language and cultural complexities highlighted the importance of acknowledging diverse cultures in cross-national studies of this nature.

Other cautions have been reported about the reliability of questionnaire data and the problem of social desirability. Of particular interest in the PIRLS 2006 teacher- and school questionnaire data was that some items in these questionnaires may have involved value judgments, and despite reassurances of confidentiality, in all likeliness, teachers and principals may have felt the need to place themselves in a better light in providing socially acceptable responses. For example, in the PIRLS 2006 principal questionnaire, 80% of principals confirmed cooperation and collaboration among teachers in the school. Such a high percentage is in direct contrast to teacher reports that were collected during interviews at the time of the PIRLS 2006 data collection and visits to schools. Many teachers admitted that their workload and administrative duties prevented them from collaborating and cooperating with their colleagues. The PIRLS 2006 teacher and school questionnaires may not always have led to reliable responses, specifically where teachers felt obliged to provide answers in line with their perceptions of the purpose for which the research sought to gather evidence.

9.4.2. The Use of Hierarchical Linear Modelling Techniques

In previous chapters and in discussing the results, it was noted that for the purposes of this study, the aim was not for findings to point to causality or to provide evidence for a causal relationship among any of the variables used in the model. At the most, some causal relationships could be rendered plausible or probable on the basis of the data. Since it is not possible to rule out all other explanations or factors that influence reading achievement, and since one is restricted by what the data set and its structure could provide, the aim of the analysis was to attempt to identify those factors which might be deemed most ‘probable’ in plausible claims of the form that ‘factor A contributes most to reading literacy achievement for a particular language group’.

Answers to research questions posed in this study were explored through Hierarchical Linear Model (HLM) techniques. In using a theoretical point of departure (in the form of Creemer’s Model of Educational Effectiveness) as justification for including some PIRLS 2006 variables directly or indirectly in the

model, the study took a confirmatory approach. While other statistical techniques could have been used fruitfully in attempts to answer the research questions posed by this study (such as Structural Equation Modelling), the choice for HLM was justified in its ability to take account of the nested structure of the data, its ability to impute missing values and its ability to use all five Plausible Values as outcome variables in computing model results (as argued in Chapter 5). However, a limitation of using HLM is its inability to test indirect effects of explanatory variables on an outcome variable, and in this study only direct effects could be tested.

For the purposes of building multi-level models more effectively, it was decided not to analyze data individually for each of the 11 official languages. It is noted that 11 official languages imply that analyses would have to be repeated and replicated 11 times over, with a chance that, due to small sample size, the languages spoken by less than 5% of the South African population (namely isiNdebele, Siswati, Tshivenda and Xitsonga) would be excluded from the analyses.

9.4.3. The Distinction Between First Language, Language of the Test and Language of Learning

A distinction was made in this study between ‘first language’, ‘language of learning’ and ‘language of the test’. South African children are by policy intended to start their learning at school from Grade 1 to 3 in their home language (mother tongue). However, many schools are faced with teaching learners in these initial grades in a language of learning that is nonetheless different from what is spoken at home. For Grade 1 to 3 learners, ‘home language’ does not necessarily coincide with ‘language of learning’ or ‘language of the test’. When learners approach Grade 4, the language of learning changes, resulting in more than 80% of learners being taught in a dominant second language (mostly English, a language spoken as another tongue by less than 10% of the population).

For the purposes of data analysis in this study, language groups was defined by means of 'language of learning' (in Grades 1 to 3), since the term 'home language' was not accurately indicative of whether a learner did in fact receive instruction in his or her home language. The terms 'language of learning' and 'language of the test' were used interchangeably, even if it was functionally possible that in a few cases the equivalence was moot.

9.5. LIMITATIONS OF THE STUDY

The methodological reflections of this study highlight decisions made in the conceptualization, use of data source and data analysis of this study. While decisions can mostly be justified and explained, the limitations of the study should also be noted. A number of possibilities deserve mention, namely:

1. The PIRLS 2006 data does not necessarily capture educationally and statistically significant factors at play at learner- and school-level in order to explain reading achievement scores sufficiently in a South African context. While more statistically significant factors were found for the Afrikaans and English language groupings, this significance may be reflective of the European (or predominantly Western) background of these learners who took part in a conceptualised and designed study that is also based on European (or Western) ideals. In terms of an African school context, the SACMEQ study makes provision for such a special context (e.g. asking teachers to comment on the availability of resources such as mud walls and thatched roofs typically found in many African communities). Multi-level modelling of data may prove itself useful with the use of a data source which takes these unique contextual aspects into account.
2. Statistically significant or indirect factors may be at play that are hidden from the current data source or may have inadvertently become hidden in the re-structuring of the dataset according to language groupings. Indirect effects were not tested in this study. This decision was taken in an attempt to streamline the data analysis process by not replicating the study 11 times over. By aggregating data to language groupings, little

variation in achievement could be found for African language groupings. Despite linguistic similarities, more variation may have become evident had the African languages been treated separately.

3. A decision was taken to follow a confirmatory approach in this study by relying on a theoretical framework to underpin the selection of variables for model-building purposes. In light of the lack of variation (and consequently the lack of factors of statistical significance) for the African language groupings, an exploratory approach may have been warranted instead. In using a confirmatory approach, statistically significant factors may have become hidden through the exclusion from the framework of key variables.
4. In the absence of identifiable reading effectiveness models, a school effectiveness model (in the form of Creemers' Model of Educational Effectiveness) was adopted. Significant factors found for the Afrikaans and English groupings approximate this model, but little similarity could be found for significant associations with Creemers' components and average reading scores for African language groupings. An adapted model suited to a South African schooling context is therefore still needed, possibly with a holistic, systems approach that would allow for complex relationships. A systems theory approach may provide valuable theoretical insights, taking into account the nested structure of data of this nature. More specifically, at macro (or school-) level, individual differences may become discernible when data is not handled at an aggregated (or pooled) level.

9.6. CONCLUSIONS AND RECOMMENDATIONS

In South Africa, grave concerns about low levels of learner achievement pervade research initiatives and educational debates. Despite considerable investment in educational inputs (such as policy, finance and resources), processes (such as curriculum provision, teacher support and development), outcomes in the form of learner achievement remains disappointingly low.

9.6.1. Main Conclusions

The five main conclusions that can be drawn from this study are as follows:

1. **The language of the test (i.e. Language of Teaching and Learning) is a critical explanatory variable for reading achievement in South Africa.** As much as 36% of explained variance in South African schools is attributable to language (see Chapter 8, section 8.7). An implication is that languages other than Afrikaans and English should be targeted for supportive interventions.

   The Revised National Curriculum Statement (RNCS), as issued by the national Department of Education in South Africa and described in detail in Chapter 3, professes to follow a balanced approach to literacy development. Such a balanced approach recognizes the fact that learners, upon entering their formal schooling years in Grade R, arrive at school with prior knowledge and a high proficiency in their home language, developed through a range of interactions with others at home in the context of nurturing, care and play ("Revised National Curriculum Statement Grades R-9", 2002).

   The RNCS encourages learners in the Foundation Phase (that is from Grade R-3) to do wide reading, while teachers should provide learners with opportunities for writing and developing their vocabulary and language use. Learners should be helped to discover techniques and strategies to unlock the 'code' of the written word, such as developing word recognition and comprehension skills by means of phonemic awareness, knowledge of letter-sound correspondence and knowledge of blending, which is described as the ability to put together two or three letters to make a sound.

   At the end of the Foundation Phase, the balanced approach to reading literacy as outlined in the RNCS ("Revised National Curriculum Statement Grade R-9", 2002) culminates in the Grade 3 learner having

been exposed to Reading and Viewing as a Learning Outcome, resulting in abilities to:

- Use visual cues to make meaning, e.g. read graphical texts such as photographs, maps and diagrams.
- Make meaning of written text, e.g. comment on stories or poems that were read and show understanding by answering questions on main ideas, key details, cause and effect, conclusions and personal opinions.
- Read texts alone, and use a variety of strategies to make meaning.
- Consolidate phonic knowledge, e.g. recognize that the same sound can be spelled in different ways or recognize that the same spelling can represent different sounds.
- Read for information and enjoyment, e.g. choose a variety of books to read and state what was or was not liked about them.

The foregoing description of the RNCS's view of literacy at Foundation Phase presents a utopian outlook on the reading development and context of Foundation Phase learners in South Africa. While evidence was presented in this study of the importance of learner time spent reading, learners' use of opportunities to read and parental support in providing reading opportunities, many social challenges and obstacles may prevent these RNCS ideals from being realized in the lives of many learners.

Indeed, the ideals of the DoE as described in the RNCS might well be attained in a system where:

- the majority of learners have access to social support systems in the form of literate parents
- the majority of learners have access to ample reading material in their home language

- the majority of learners' basic needs (in the form of food, shelter and clothing) are met.

While the Language in Education Policy currently strongly advocates the development of indigenous languages and opportunities for learners to be educated in their mother tongue, the South African context may rather warrant an approach to bi-literacy. During the Foundation Phase, home language is predominant, but in ensuing phases the role of the second (or even third) language becomes much more pronounced. In essence, problems with the Language in Education policy are not inherent to the policy itself, but rather with the implementation thereof. A vast difference exists between policy- and curriculum documents and what happens at learner-level in classrooms throughout South Africa.

2. **Learner-level factors explain most of the differences in reading scores within language groupings.** Vast differences in reading scores exist between the language groupings and the aggregation of data to language grouping may have provided sufficient variation for discernible effects to be detected at learner-level (see Chapter 8, section 8.7). In this study significant associations with learner age and sex confirm findings elsewhere in the literature on the topic.

The results of this study pointed to evidence for associations found at the learner-level. Age was an important predictor of reading achievement in nearly all the presented models, with the implication that reading achievement shows downward patterns per year of age of learners at Grade 5 level. This evidence clearly suggests that a suitable approach to underachievement is the early diagnosis and targeted support of learners with difficulties. This strategy is easier said than done, since many teachers in South African classrooms are faced with large classes and little experience in diagnostic testing. Anecdotal evidence points to some teachers' dilemmas where, even when teachers are aware of learners with difficulties in their classrooms, they are not knowledgeable about

appropriate steps to support the learners or to obtain additional assistance to target the problem.

One strategy to handle learners with difficulties in the South African education system has been to promote learners to progressive grades once they have been in a grade for three consecutive years. This approach may well be viable in a system where effective learner support and remediation strategies are in place. In reality, it often results in underachieving learners who cannot keep up with classwork, culminating in an increased risk of dropping out.

The results for this study showed that boys were consistently obtaining lower reading achievement scores than girls. In line with international patterns of reading achievement between boys and girls, national interventions could therefore be aimed and targeted at boys, if only to serve as an avenue to get boys interested in reading.

3. **Most of the differences in reading achievement scores cannot be explained using the conceptual framework for this study.** In particular, the framework was insufficient to explain the performance of children using African languages as LOLT (see Chapter 8, section 8.7). The African language grouping models did not fit the conceptual framework and little evidence could be found for factors included in the model where one would have expected statistically significant effects. This lack of evidence suggests that the current contextual data for African learners is insufficient to give evidence about associations and that stronger association and more data is required for the model to be tested effectively for the African language groupings.

4. **The conceptual framework was more appropriate in explaining reading achievement scores for the Afrikaans and English language groupings than for those from African language groupings.** Significant effects of school socio-economic status were found for the Afrikaans and English groupings, corroborating literature that infers the

influence of socio-economic status on learner achievement (see Chapter 8, section 8.7).

5. **School-level factors have no discernible effect on Grade 5 learners from African language groupings.** Only one factor (reading opportunity created by the teacher) showed statistical significance at school-level for the overall South African model (see Chapter 8, section 8.7). Since the absence of statistical significance should not be equated with the absence of educational significance, this finding may be related to minimal variation within the African language groupings. The aggregation of learner-level data to groupings of linguistic similarity may hide associations that might be found from separate analyses of sufficient data from each model.

   Results that emanated from this study, as discussed in Chapter 8, pointed to the fact that very few statistically significant factors could be found at classroom- and school-level for each of the models that were built in this study. Apart from teacher time spent on reading in the overall model, none of the school-level factors in models to follow proved to have the same statistical significance.

   The importance of these factors at classroom- and school-level, are however, not diminished. A lack of statistical significance should not be regarded as lack of importance of the factor's effect on reading achievement in totality. Instead, as suggested by the discussion in Chapter 8, otherwise significant effects could be hidden within or beyond the current data source, but yet still represent important associations with reading achievement, and hence mirror literature on the topic and what is known about that which works in terms of classroom practice.

   From descriptions in Chapter 6 that particularly focused on teacher behaviour in the class, it became apparent that for the majority of Grade 5 learners' teachers there is still a heavy reliance on textbooks and very little use of other resources in teaching reading. Also of interest was the

reported late introduction of reading skills and strategies to learners from Grades 1 to 4, a pattern that proved inconsistent with international patterns where learners are introduced to more complex skills and strategies much earlier in their formal schooling careers. Principal reports on learners' perceived readiness to read when entering the school in Grade 1, mirror those on the late introduction of reading skills and strategies. Low percentages of learners' principals reported that learners entered their schools in Grade 1 with a sufficient repertoire of early literacy skills, such as basic letter and word recognition, basic numeracy skills and basic sentence construction abilities.

9.6.2. Additional Reflections

In writing additional reflections, I share my views and beliefs which may not be grounded in empirical evidence, but arose from experiences in the field, resulting in reflections on the South African situation.

The picture painted by the South African educational landscape is one where, for many children, basic needs are not met and social amenities are absent and do not form part of the child's frame of reference. While there is importance and nobility in pursuing and assessing ever increasing reading literacy levels, its importance pales when the empty stomachs of and absence of parental guidance for many children are taken into account.

As a country, South Africa's first participation in PIRLS took place in 2006. Participation in other international studies included participation in the Trends in Mathematics and Science Study (TIMSS), and repeated participation in the Southern and Eastern African Consortium for the Monitoring of Educational Quality (SACMEQ). While South Africa is not a newcomer to international testing, there is still a peculiar test naivety among learners and schools. Many Grade 5 learners encountered reading comprehension assessment for the first time when they participated in PIRLS 2006. Large scale assessment of learners in future testing must ensure that:

- Learners have had sufficient opportunity to learn the skills and content that will be tested
- If the stakes of the test are high, learners must be provided with more than one opportunity to demonstrate their capabilities, specifically in the presence of language difficulties unrelated to the subject (such as translation issues which were encountered in the PIRLS 2006 reading assessments).

Many Grade 5 learners had difficulty answering the questions in the PIRLS 2006 assessment, specifically since the assessment entailed a format and required tasks that were completely new to these learners. Anecdotally, there was evidence that a number of learners were not familiar with the question format. Especially multiple-choice items proved to pose quite a challenge. While this inability at learner-level to deal with the PIRLS 2006 assessment format is problematic in itself, the root of the problem could be found at teacher level. Teachers may require and expect very little of their learners in reading comprehension tasks, and surface level questioning on passages may have become the norm. When confronted with stringent assessment tasks, such as those found in PIRLS 2006, it is therefore not surprising that learners found the task unfamiliar and were unable to produce even a minimum level of response required by the assessment.

While participation in international assessments provides an opportunity to gauge the extent of difference between the intended, implemented and attained curricula, I also came to realize that in the South African context, the oral tradition of many learners is not accounted for by the format of these assessments. In many African cultures, a high premium is not placed on the ability to express oneself in reading and writing. Instead, higher value is placed on the ability to communicate orally. With a high premium placed on oral communication, there is very little need for books and printed media, thus enforcing a vicious cycle with little availability of printed media in indigenous languages. While the national curricula make provision for Learning Outcomes related to speaking (specifically in the Foundation and Intermediate Phases),

the curricular emphasis still remains on the ability to read and write. The oral aspect of learners' ability to comprehend reading passages is omitted in international assessments and evidence for a large part of what learners may understand had they been given tasks orally are lost.

A uniformly constructed curriculum has to be able to be implemented in a diverse and complex South African education system. While the South African PIRLS 2006 reading achievement results mainly show extremely poor achievement, evidence was found that some learners were able to reach satisfactory reading achievement scores. The implication of this varied reading performance points to the ability of some teachers in the education system to interpret the curriculum and teach at its required level. For the majority of teachers, however, the interpretation and implementation of the curriculum remains a challenge that is often beyond their grasp.

In South Africa, vast differences exist between groups of learners in terms of performance and educational experience. While improvements in educational access can be seen, issues around quality and equity are still of concern. Of specific concern is the ever-widening gap that seems to pervade South Africa's education system, with vast differences in performance and educational quality between high and poor performing schools. The implication of poor performance directly translates into lack of skills and knowledge, a dire consequence for a country in desperate need of skilled, knowledgeable workforce. The question remains as to how such gaps can be narrowed without requiring high performing schools to sacrifice acceptable standards in order for poor performing schools to be adequately resourced to catch up and narrow the gap.

Lastly, the often dire social circumstances of learners deem any gauge or measurement of ability almost futile. Assessing learners' reading performance in South Africa often takes place while hunger and many other physical needs have not been met. These circumstances beg the question of how learners can be expected to achieve optimally when basic needs are unmet and whether any

systemic interventions can permit an adequate gauging of what learners are truly able to achieve currently.

9.6.3. Recommendations

In this section, recommendations are provided based on the main conclusions that were drawn from this study.

9.6.3.1. Recommendations for Policy and Practice

1. The South African context warrants a stronger bi-literacy approach. Given that, during the Foundation Phase, home language is predominant, in ensuing phases the role of the second (or even third) language should become much more pronounced. This study provided evidence for the problematic achievement of learners when assessed in their language of learning (i.e. the language of the test). The Language in Education Policy strongly advocates the development of indigenous languages and opportunities for learners to be educated in their mother tongue, with the language of learning changing from an indigenous language to English for most learners in Grade 4. This language change does not take place effectively for most learners, and teachers likely revert back to instruction in learners' home language. In essence, problems with the Language in Education policy are not inherent to the policy itself, but rather with the implementation thereof. A vast difference exists between policy- and curriculum documents and what happens at learner-level in classrooms throughout South Africa.

2. Early diagnosis and targeted support of learners with difficulties is needed. Factors affecting reading achievement at learner-level were very pronounced in this study. The Afrikaans and English models' results confirm existing literature on learner-level factors (like age and sex, as discussed by Mullis et al (2007) in the PIRLS 2006 International Report) that affect reading achievement. With reading achievement showing downward patterns for increases in age while a learner remains in Grade 5, a suitable approach to underachievement is the

early diagnosis and targeted support of these learners with difficulties. This, however, is easier said than done, since many teachers in South African classrooms are faced with large classes and little experience in diagnostic testing. Anecdotal evidence points to some teachers' dilemmas where, even when they are aware of students with difficulties in their classrooms, they are not knowledgeable in taking appropriate steps in providing the correct support or additional assistance to target the problem.

With boys consistently achieving lower reading scores than girls, national interventions could be aimed and targeted at boys, if only to serve as an avenue to get boys interested in reading. Areas of future research may have to be targeted at the most basic variables related to the learner, as these are most likely to result in informed policy changes and targeted teacher training in areas of learner support where it is needed most.

3. Learners in Foundation Phase should be afforded more opportunities not only to read, but also to write. From responses gathered in the PIRLS 2006 reading assessment, it became clear that the problem of reading comprehension did not end with reading alone. Learners in general were not able to pen their ideas or thoughts adequately and while responses to questions were often on the right track, learners stopped short of providing sufficient detail, evidence or reasoning in their written responses.

While little evidence was found for the effect of school- and classroom-level variables in this study, the educational significance of the school environment should not be diminished. The recommendations that are made in this study on classroom- and school-level mirror some of the recommendations made by Howie, Venter, Archer, Long, Scherman, van Staden and Zimmerman (2009) in the PIRLS 2006 provincial reports:

4. More attention needs to be paid to the development of teaching reading strategies during the Foundation- and Intermediate Phases in schools. Anecdotal evidence that was gathered during the PIRLS 2006 data collection highlighted repeated reports by teachers that they lacked the knowledge and

skills necessary to teach young learners how to read, and specifically achieve the aims and objectives entailed by an Outcomes-Based philosophy of education.

5. More complex reading skills and strategies need to be introduced to learners at an earlier stage than they are reportedly being introduced at this point. Foundation phase teachers seem very capable of teaching learners to decode text, yet proficiency in more complex reading skills and strategies are lacking. These elements include reading connected text, identifying the main idea of text, explaining or supporting understanding of text, comparing text with personal experience, comparing different texts, making predictions about what will happen next, making generalizations or inferences and describing the style and structure of text.

6. A culture of reading needs to be fostered and developed at school-level at each phase in primary schools. It was heartening to see that during PIRLS 2006 data collection many schools urged learners to have reading books with them to be read when they had some idle time in the classroom upon completion of tasks or assignments. Yet, this phenomenon was not discernible in the majority of schools and instead it became apparent that the idea of reading for pleasure had not been fostered in many schools.

7. Teachers need to be made aware of the importance of reading across all Learning Areas, not only for Literacy or Languages. For some teachers, a compartmentalized perception exists in which they do not regard the teaching of reading in their subject areas as part of their responsibilities, if they do not teach Literacy or Language. This perception means an added burden to teachers working specifically in the areas of Language and Literacy. It also means that teachers in other Learning Areas may be faced with learners who are not able to use reading to learn, thereby frustrating any attempts to teach content in these other Learning Areas.

8. Classrooms need to be adequately resourced with developmentally appropriate materials for the teaching and learning of reading at all primary

school grades. It is, however, important to note the distinction between the availability of resources and their actual use. In many schools, resources are available, yet these resources are not being used for fear of damage, loss or (as is the case with Physical Science) a lack of teacher knowledge on how to use equipment.

9. Teachers need to creatively develop additional reading materials to promote a variety of text experiences for learners. These materials include the use of newspaper cuttings and magazine articles. Examples from the immediate environment can be used (e.g., billboards or advertisements), while material from other Learning Areas should not be excluded when providing learners with a rich experience in text types.

10. Teachers need to create a literacy-enriched classroom environment so that learners can become involved and familiar with the printed word. From the PIRLS 2006 data collection it became apparent that many learners were not used to reading the printed word in their language of teaching.

11. Each school should be equipped with a functioning school library which is actively used by teachers and learners. Partnerships with NGOs and businesses in the community may prove meaningful in fostering and cultivating a love for reading by both teachers and learners.

12. Teachers should exhibit reading behaviour more often and more clearly in the presence of learners. By modelling the desired behaviour, learners may be better inspired to show similar behaviour, instead of merely following instructions from teachers who themselves never visibly engage in any reading.

13. Lastly, *creativity around reading should be fostered*. In a number of participating PIRLS 2006 schools, evidence was found that creative ideas and activities encourage reading and a love for reading. Examples of such activities include ‘readathons’ in which prizes were awarded to learners who read the highest number of books in a given time, or events involving learners and parents over weekends in reading groups where volunteers from communities

read stories aloud to families. In impoverished areas, creativity can be fostered even in the absence of financial resources. In one example, a school principal agreed to do something embarrassing (i.e. sit on the school's roof) if learners were able to read a specified number of books in a given time. Other examples include teachers who took library books to the children on the sport field and did not wait for learners to come to the library, or a teacher who dressed up as 'The Reading Witch' once a week to read to her learners, to their great amusement.

9.6.3.2. Conceptual Framework Recommendations

a). Improved indicators of context are needed for South Africa. Evidence was provided that the conceptual framework was inadequate in identifying factors affecting reading achievement for all South African language groupings. More specifically, the framework was only appropriate in explaining reading achievement scores for the Afrikaans and English language groupings than for those from African language groupings. It may be suggested that the current contextual data for African learners is insufficient and that more variation is required for the model to be tested effectively, specifically for the African language groupings.

b) An exploratory approach is warranted when dealing with contextual data and South Africa's 11 official languages. While a decision was taken to use a confirmatory approach in this study, it may be recommended that an exploratory approach may be more appropriate when working with African languages. The treatment of the 11 official languages into five language groupings may have also affected the frameworks' adequacy in capturing statistically and educationally significant factors that affect Grade 5 reading achievement scores. African languages may have to be treated separately in future research, since aggregation may lead to the identification and significance of some factors becoming hidden from the framework.

Lastly, the absence of an identified model for reading achievement may suggest changes to the framework to suit the South African landscape more adequately.

Finally, the results of this study can be summarized in three main findings:

Grade 5 learners in South African primary schools who participated in PIRLS 2006 were not able to achieve satisfactory levels of reading competence. The gravity of this finding is exacerbated by the fact that these learners were tested in the language in which they had been receiving instruction during the Foundation Phase of schooling.

Significant factors associated with reading literacy are mostly found at learner-level, but this does not mean that the existence of teacher- and school-level factors is not of importance. While some explanatory factors at learner-level can more easily become the target of reading interventions, the higher level effect of the classroom and school are not diminished by this study.

Since the completion of this study, the National Department of Education announced the abolishment of OBE as part of curricula in South Africa. Participation in PIRLS 2011 will also be undertaken, where unanswered questions left by this research may be answered.

The cultivation of a passion for reading, a culture of reading in South African households, classrooms and schools and the continual monitoring of reading achievement remain imperatives for the South African schooling system in years to come.

The importance of a reading literate country is emphasized by Mullis et al (2007) in the introduction of the PIRLS 2006 International Report:

> In today's information society, the ability to read is essential for maximizing success in the endeavours of daily life, continuing intellectual growth, and realizing personal potential. Similarly, a literate citizen is vital to a nation's social growth and economic prosperity (p.15).

The ultimate cost of an illiterate population for whom reading is inaccessible and unvalued include dire life-long economic and social consequences, both for the individual and communities.

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