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:

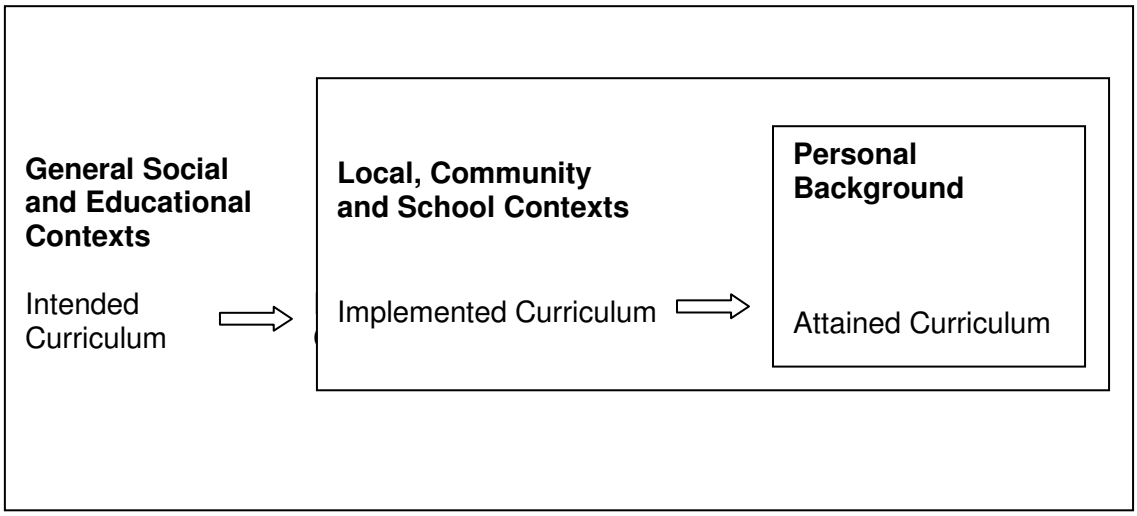


Figure 5.1: Conceptual Framework for International Comparative Studies

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).

Levels: **Characteristics of Quality, Time and Opportunity:** **Formal Criteria:**

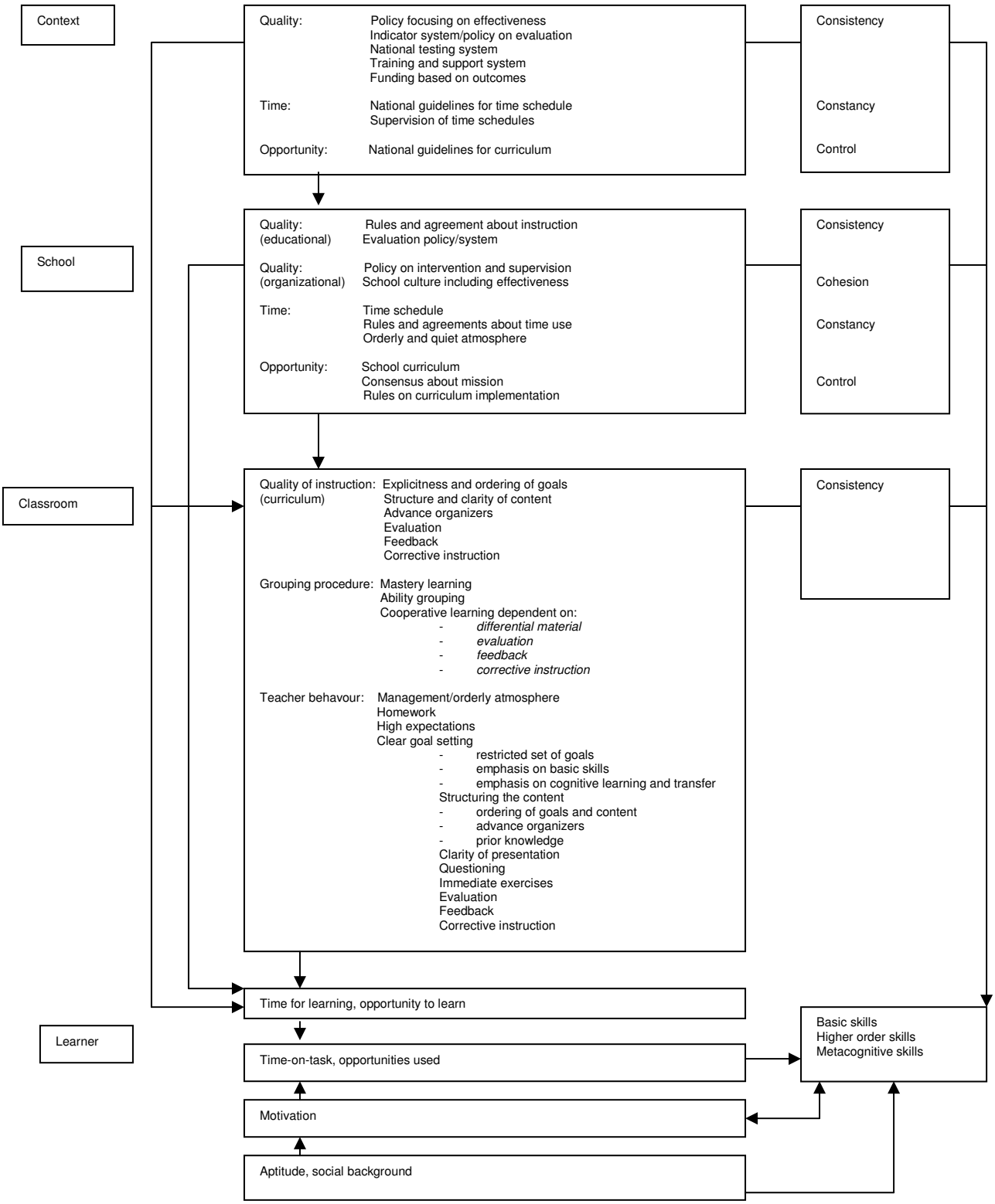


Figure 5.3: Creemers' Comprehensive Model of Educational Effectiveness (Bos, 2002).

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.

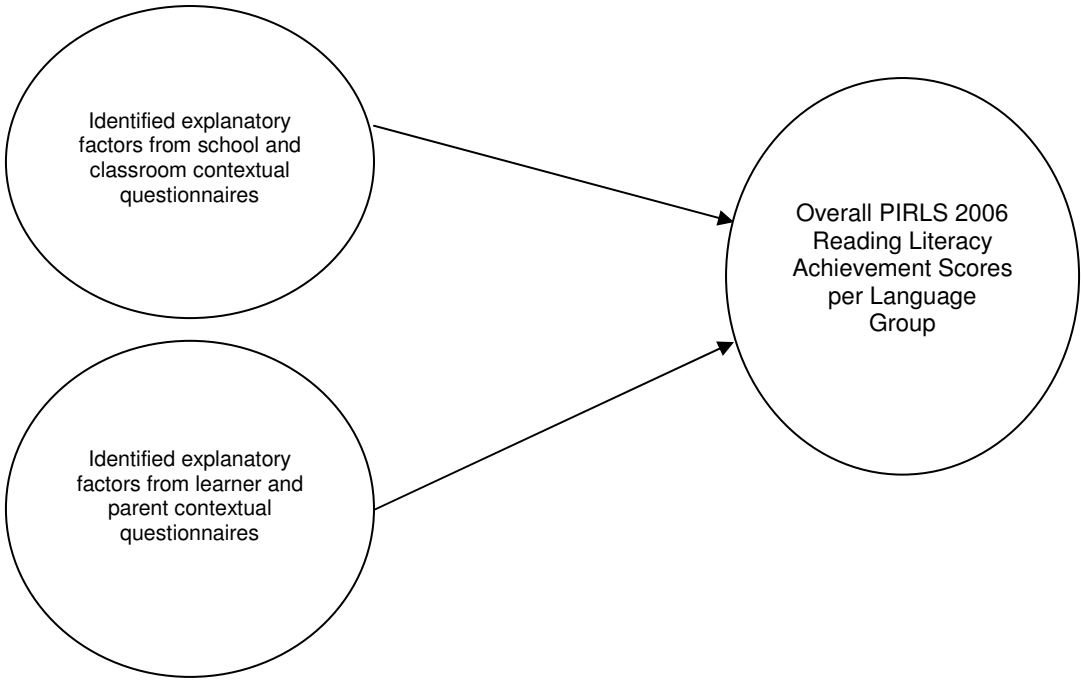


Figure 5.4: A Two Level Model of Variables Associated with Reading Literacy Achievement

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.

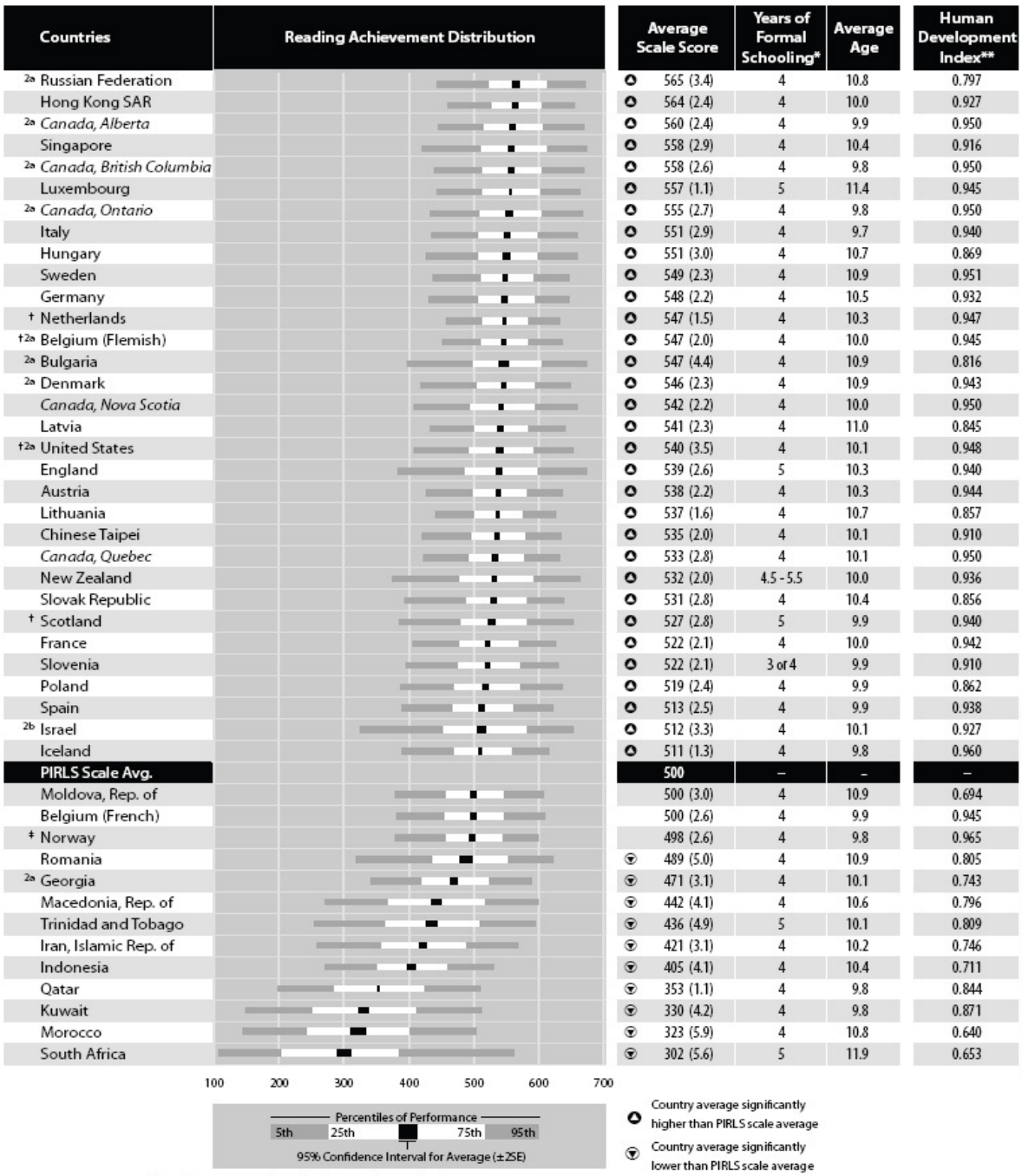
Table 6.1: PIRLS 2006 Participating Countries and Education Systems

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.



Countries	Average Scale Score	Years of Formal Schooling*	Average Age	Human Development Index**
2a Russian Federation	565 (3.4)	4	10.8	0.797
Hong Kong SAR	564 (2.4)	4	10.0	0.927
2a *Canada, Alberta*	560 (2.4)	4	9.9	0.950
Singapore	558 (2.9)	4	10.4	0.916
2a *Canada, British Columbia*	558 (2.6)	4	9.8	0.950
Luxembourg	557 (1.1)	5	11.4	0.945
2a *Canada, Ontario*	555 (2.7)	4	9.8	0.950
Italy	551 (2.9)	4	9.7	0.940
Hungary	551 (3.0)	4	10.7	0.869
Sweden	549 (2.3)	4	10.9	0.951
Germany	548 (2.2)	4	10.5	0.932
† Netherlands	547 (1.5)	4	10.3	0.947
†2a Belgium (Flemish)	547 (2.0)	4	10.0	0.945
2a Bulgaria	547 (4.4)	4	10.9	0.816
2a Denmark	546 (2.3)	4	10.9	0.943
Canada, Nova Scotia	542 (2.2)	4	10.0	0.950
Latvia	541 (2.3)	4	11.0	0.845
†2a United States	540 (3.5)	4	10.1	0.948
England	539 (2.6)	5	10.3	0.940
Austria	538 (2.2)	4	10.3	0.944
Lithuania	537 (1.6)	4	10.7	0.857
Chinese Taipei	535 (2.0)	4	10.1	0.910
Canada, Quebec	533 (2.8)	4	10.1	0.950
New Zealand	532 (2.0)	4.5 - 5.5	10.0	0.936
Slovak Republic	531 (2.8)	4	10.4	0.856
† Scotland	527 (2.8)	5	9.9	0.940
France	522 (2.1)	4	10.0	0.942
Slovenia	522 (2.1)	3 or 4	9.9	0.910
Poland	519 (2.4)	4	9.9	0.862
Spain	513 (2.5)	4	9.9	0.938
2b Israel	512 (3.3)	4	10.1	0.927
Iceland	511 (1.3)	4	9.8	0.960
PIRLS Scale Avg.	**500**	–	–	–
Moldova, Rep. of	500 (3.0)	4	10.9	0.694
Belgium (French)	500 (2.6)	4	9.9	0.945
‡ Norway	498 (2.6)	4	9.8	0.965
Romania	489 (5.0)	4	10.9	0.805
2a Georgia	471 (3.1)	4	10.1	0.743
Macedonia, Rep. of	442 (4.1)	4	10.6	0.796
Trinidad and Tobago	436 (4.9)	5	10.1	0.809
Iran, Islamic Rep. of	421 (3.1)	4	10.2	0.746
Indonesia	405 (4.1)	4	10.4	0.711
Qatar	353 (1.1)	4	9.8	0.844
Kuwait	330 (4.2)	4	9.8	0.871
Morocco	323 (5.9)	4	10.8	0.640
South Africa	302 (5.6)	5	11.9	0.653

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.

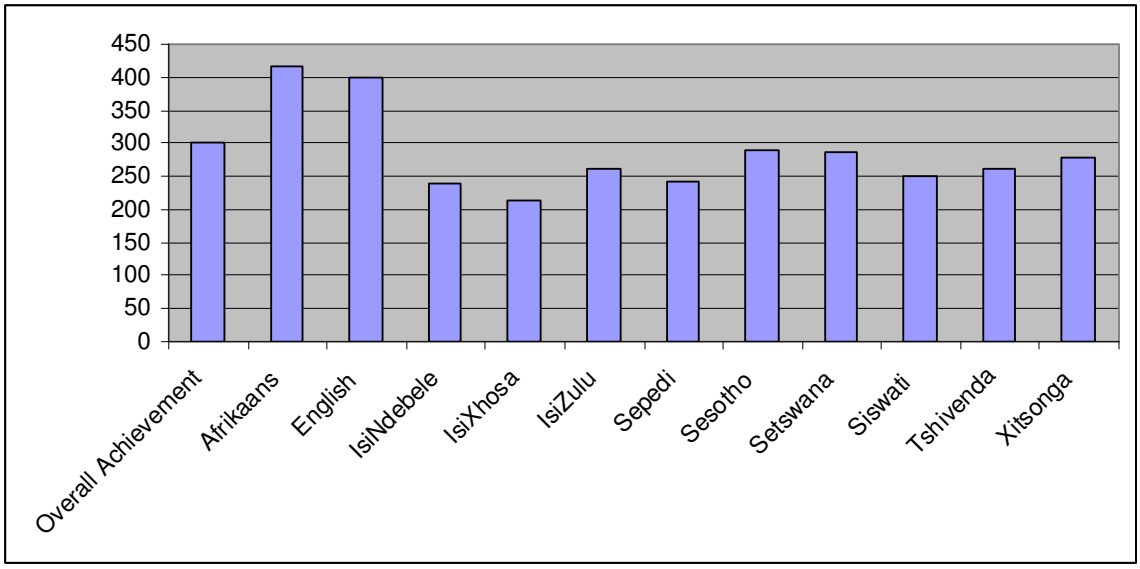


Figure 6.2: Grade 5 Achievement by Language

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.

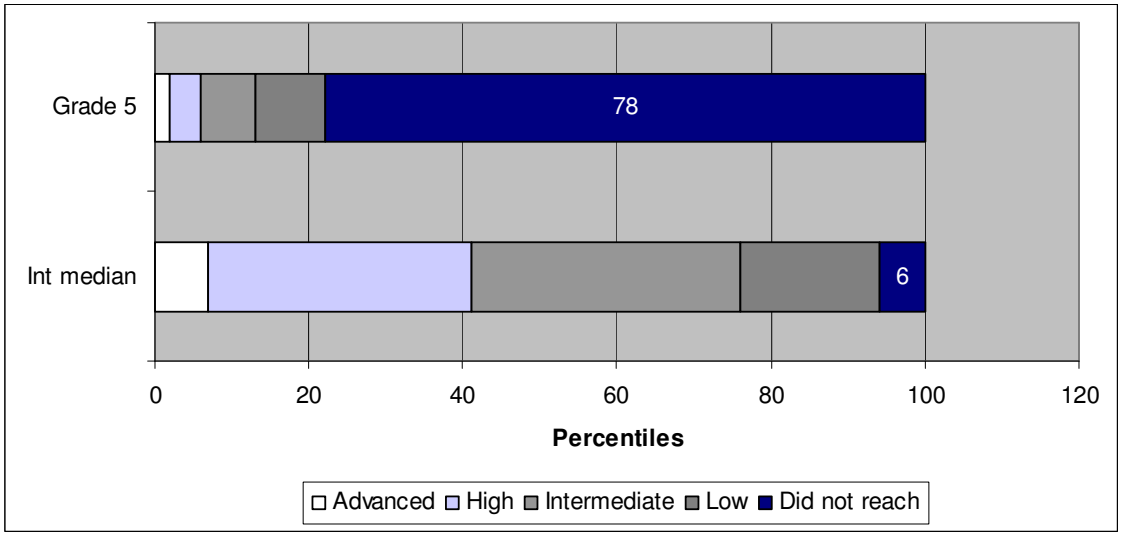


Figure 6.3: International Benchmark Achievement Patterns Compared to South African Grade 5 Benchmark Achievement Patterns

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.

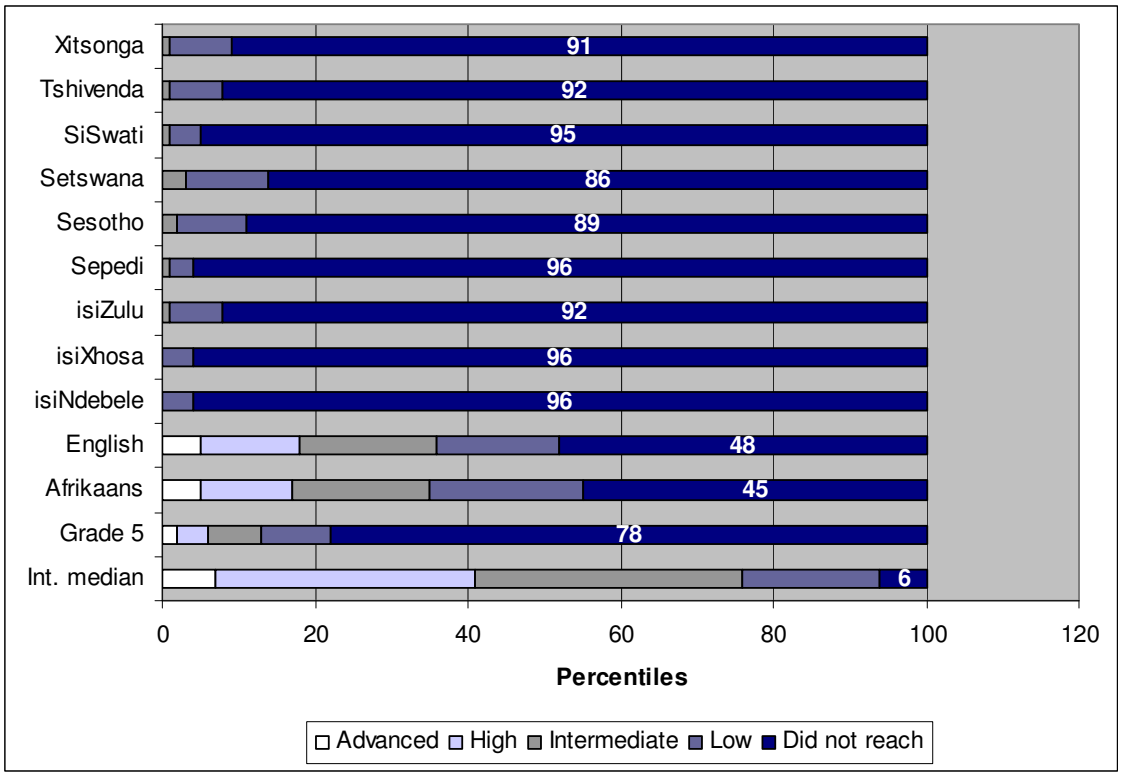


Figure 6.4: South African Grade 5 Benchmark Achievement per Language

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:

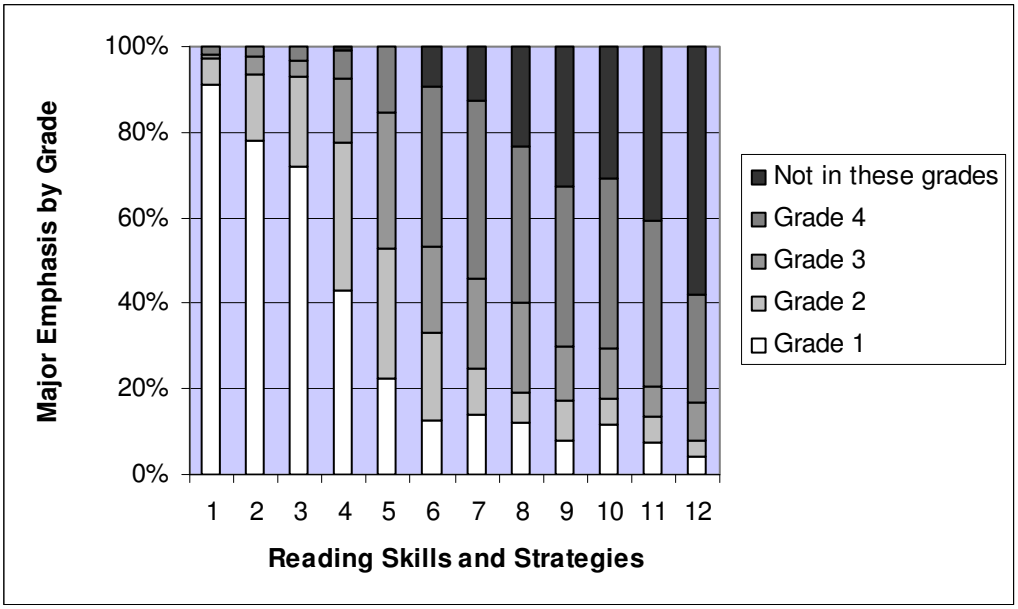


Figure 6.5: Grades by which Reading Skills and Strategies Receive First Major Emphasis

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.

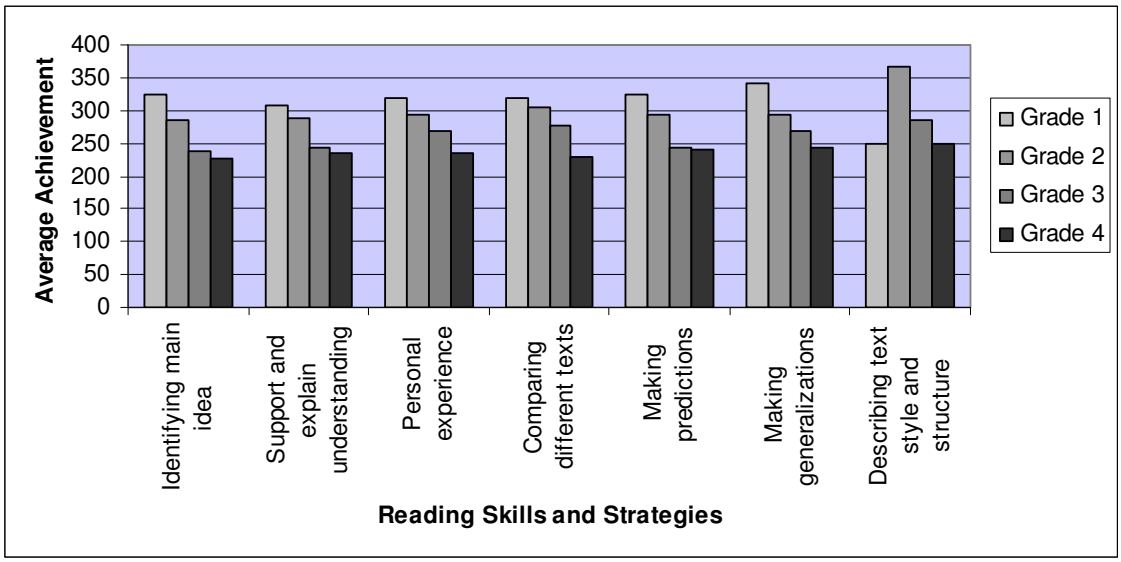


Figure 6.6: Average Achievement by Grades of Introduction of Complex Reading Skills and Strategies

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:

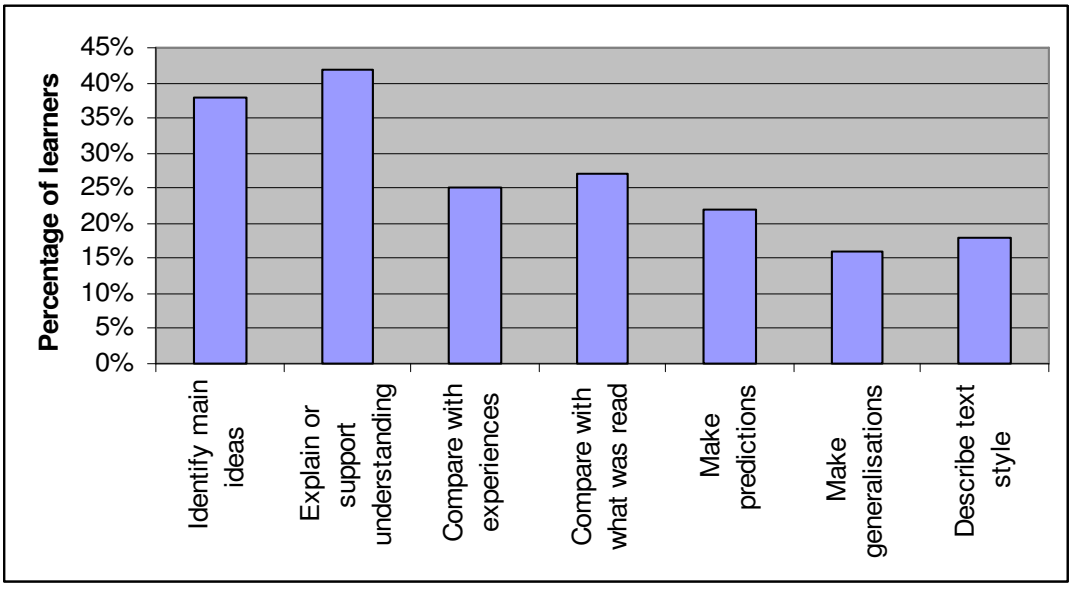


Figure 6.7: Percentages of Grade 5 Learners Exposed to Types of Reading Comprehension Activities

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.