A COMPARATIVE ANALYSIS OF TEACHER COMPETENCE AND ITS EFFECT ON PUPIL PERFORMANCE IN UPPER PRIMARY SCHOOLS IN MOZAMBIQUE AND OTHER SACMEQ COUNTRIES

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This thesis is dedicated to:

My dearest and lovely granddaughter Thandi Isabel

My husband, Fernando Songane

My lovely daughter, adorable son and son-in-law,
Cláudia Isabel, Mário Jorge and Alper José

My dear mother, Isabel Jamba,

My brothers and sister

The memory of my father, Filipe José Passos,

My brothers and sister

and

Sister Maria Isabel Oliveira

and

The Congregation of Mary Presentation

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LIST OF ACRONYMS

CES	Classroom Environment Study
CFPP	Curso de Formação de Professores Primários (Primary Teacher Training Course)
CIDA	Canadian International Development Agency
DANIDA	Danish International Development Agency
DINEB	Direcção Nacional do Ensino Básico (National Directorate for Basic Education)
EFEP	Escola de Formação e Educação de Professores (Teacher Training and Education School)
EP1	Ensino Primário do 1º Grau (Low Primary Education)
EP2	Ensino Primário do 2º Grau (Upper Primary Education)
EHPPE	Escolas de Habilitação de Professores do Posto Escolar (Teacher Training School)
FRELIMO	Frente de Libertação de Moçambique (Mozambique Liberation Front)
FIMS	First International Mathematics Study
GDP	Gross Domestic Product
HDI	Human Development Index
IEA	Evaluation of Educational Achievement
IMAP	Instituto do Magistério Primário (Teacher Training Institute)
IMP	Instituto Médio Pedagógico (Pedagogical Medium Institute)
INE	Instituto National de Estatística (National Institute of Statistics)
INDE	Instituto Nacional do Desenvolvimento de Educação (National Institute for Educational Development)
LLECE	Laboratorio Latinoamericano de Evaluación de la Calidade de la Educación (Latin American Laboratory for Assessment of the Quality of Education)
MEC	Ministério da Educação e Cultura (Ministry of Education and Culture)
MINED	Ministry of Education
MPM	Multiple Regression Model
NRC	National Research Co-ordinator
PASEC	Programme d'Analyse des Systèms Éducatifs de la CONFEMEN (Programme on the Analysis of Education System)
PIRLS	Progress International Reading Literacy Study
PCA	Principal Component Analysis
PISA	Program for International Student Assessment
SES	Socio-Economic Status
SACMEQ	Southern and Eastern Africa Consortium for Monitoring Education Quality
SIMS	Second International Mathematics Study
SIDA	Swedish International Development Authority

SISS	Second International Science Study
SNE	Sistema Nacional de Educação (National Education System)
TIMSS	Third International Mathematics and Science Study
UEM	Universidade Eduardo Mondlane (Eduardo Mondlane University)
UP	Universidade Pedagógica (Pedagogical University)
UNDP	Unit Nations Development Programme
UNESCO	United Nations Education Scientific and Cultural Organization

ABSTRACT

Several cross-national studies, which monitor the quality of education in many countries across the world, have been conducted over the recent years. The International Association for the Evaluation of Educational Achievement (IEA), founded in 1958 by a group of European and American researchers (Grisay and Griffin, 2004), wanted to measure the achievement of comparable samples of students in various subjects and in diverse school systems, with the view of investigating the relationships between possible differences in achievement and differences in inputs, processes and educational contexts.

Since Mozambique's independence in 1975 there have been many small research studies undertaken by the Ministry of Education and universities, which have not been nationally representative. One exception is a nationally representative study conducted under the auspices of the Southern and Eastern Africa Consortium for Monitoring Educational Quality (SACMEQ) implemented in 2000 and comprising 15 systems of education, namely Botswana, Kenya, Lesotho, Malawi, Mauritius, Mozambique Namibia, Seychelles, South Africa, Swaziland, Tanzania, Uganda, Zambia, Zanzibar and Zimbabwe.

This thesis is a quantitative study and undertakes a secondary analysis using a sample from the SACMEQ database archive collected in 2000 in all countries except Zimbabwe in reading and in mathematics. The Mozambican sample was drawn from 3 177 pupils in 168 schools, while in the SACMEQ study the sample was composed of 41 686 pupils within 2 305 schools. The purpose of this study was to describe and explore the main factors that have an effect on Grade 6 teacher competence and pupil performance in reading and mathematics.

Findings reveal that the relationship between teacher competence and pupil performance in reading and mathematics in upper primary schools in Mozambique, as well as in SACMEQ countries, is influenced by a cognitive domain, an affective domain and a behavioural domain. In addition, teacher competence and pupil performance are affected by many constructs but in this study 10 main predictors related to teacher competence and pupil performance, were identified.

The Cheng and Tsui model (1998) was adopted and adapted as a conceptual framework for this study and findings reveal that for SACMEQ countries as a whole, the data in some way is consistent with the adapted model and fill two domains, namely cognitive and behavioural within the following six constructs: teacher training, teacher characteristics, internal and external teaching

context, pre-existing pupils' characteristics and parent and community involvement. However, no individual country is completely consistent with the adapted model.

This study, taking into account the role of the teacher on pupil performance, as emphasized by many researchers such as Chapman and Mählck (1997), Châu (1996), Darling-Hammond (1999) and Kanu (1996), is intended to be a modest contribution for the Ministries of Education in SACMEQ countries although it has particular reference for the Ministry of Education and Culture in Mozambique. For instance, on the one hand, the Ministry has conducted few studies in upper primary schools related to the pupil and teacher performance and, on the other hand**,** Mozambique as a Portuguese speaking country, has a unique history, tradition and system of education which differs from that of the other participating countries.

The SACMEQ studies have provided valid and reliable data on which important decisions could be based. Specifically, SACMEQ II provided relevant, high quality data about the academic profile of teachers, the level of performance in the areas assessed, school management and other aspects that are relevant for policymaking. A comparative analysis, using such a cross-national study, is important for the Ministry of Education and Culture in order to have an overview of the performance of teachers and pupils in other school systems within the SACMEQ countries. By identifying the weaknesses and the strengths in each system, all SACMEQ countries can learn from one another. However, the results of this analysis should be used with caution, taking into consideration the history, location, economy and culture of each country.

Within the educational context of the region, many benefits are also apparent. The data collected through SACMEQ II can be considered to be of extreme importance for Mozambique's education system, since it provides the country with important data to promote a reflection on its primary education sector, to identify the position of Mozambique's education system within the region, and to work towards its improvement.

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CHAPTER 1

INTRODUCTION

> "The challenge of basic education policy is not only a challenge of quality but also one of equality: of equal opportunities to learn and achieve".
> (Sedel, in Verspoor, 2003 p.43)

The aim of this study is to investigate the effect of teacher competence on pupil performance in upper primary schools in Mozambique and other SACMEQ countries. UNESCO, the United Nations Educational, Scientific and Cultural Organisation, in accord with The Universal Declaration of Human Rights, believes that there should be "full and equal opportunities for education for all." Working towards this aim over the past 60 years has led to the development of the Education for All (EFA) movement, which aims to give everyone the chance to learn and benefit from basic education – not as an accident of circumstance, nor as a privilege, but as a right. This movement's goals are to expand early childhood care and education, provide free and compulsory primary education for all, promote learning and life skills for young people and adults, increase adult literacy by 50 percent, achieve gender parity by 2005 and gender equality by 2015, and finally, to improve the quality of education.

African countries racked by the legacy of colonial rule, their fight for independence and their outdated colonial systems of education have over the recent past worked hard at putting UNESCO's mandate and particularly EFA's goals into practice by becoming partners in working toward these ends. Mozambique, and other SACMEQ[1] countries, are signatories to this framework document and have committed themselves to improving access to and the quality of education.

However, there is growing concern about the standard of education in Mozambique and other SACMEQ countries, as they continue to grapple with the task of implementing new systems while maintaining their standards. The aim of the various ministries of education is to ensure that all the children for whom they are responsible have access to schooling, but also in accordance with EFA's goals to ensure that the education provided to them is seen to be worthwhile and of sufficient quality. Quality education depends, crucially, on the teaching and learning process, as well as on the relevance of the curriculum, the availability of materials and the conditions of the learning environment (UNESCO, 2008).

This thesis provides comprehensive information about and understanding of the relationship between teacher competence and pupil performance in upper primary education in Mozambique and other SACMEQ countries. The first chapter begins with this introduction, followed by an overview of the context of the study in Section 1.1, which leads into a statement of the problem in Section 1.2, while Section 1.3 presents a motivation for the study. The significance of the study is described in Section 1.4, the research approach and design are presented in Section 1.5, which is followed by a statement of the limitations of the study in Section 1.6, and finally Section 1.7 presents the structure of the thesis.

1.1 THE CONTEXT OF THE STUDY

The Republic of Mozambique is located in the southeastern part of Africa and is divided into eleven provinces, namely Cabo Delgado, Niassa, Nampula, Tete, Zambézia, Manica, Sofala, Inhambane, Gaza, Maputo Província and Maputo Cidade (the capital of the country). According to the 2007 census (Instituto Nacional de Estatística - INE, 2008)**,** Mozambique has an overall population of 20 530 714 inhabitants with 52.3% of the overall population being female. The gross illiteracy rate is 34.3%, with the overall illiteracy rate amongst the female population being 66.7% (INE, 2008).

Mozambique was a Portuguese colony from the fifteenth century until political independence from Portuguese rule was attained in 1975. It is a multilingual country with eighteen main Bantu languages (Sitoe and Ngunga, 2000) and Portuguese is the official language and language of instruction from Grade 1.

[1] The SACMEQ countries are Botswana, Kenya, Lesotho, Malawi, Mauritius, Mozambique, Namibia, the Seychelles, South Africa, Swaziland, Tanzania, Uganda, Zambia, Zanzibar and Zimbabwe.

The National System of Education (SNE) was introduced in 1983. The three main objectives of the education system proposed by the Strategic Plan for Education (1998) were to increase access and educational opportunities at all levels of the education system for all Mozambicans, to maintain and improve the quality of education, and to develop an institutional and financial framework that would sustain Mozambican schools and pupils in future.

This background then outlines the context of this study where, for the first time, national and regional samples are used to analyse the relationship between teacher competence and pupil performance in Mozambique and in SACMEQ countries.

1.2 STATEMENT OF THE PROBLEM

The quality of education is a central theme in education systems. The quality of education is increasingly judged by focusing on pupil performance, what pupils actually learn, and how well they learn it. A number of studies have been conducted with the purpose of understanding how quality in education is achieved. Grauwe and Varghese (2000) focus on the textbook as the key factor for improving quality in education rather than on teacher competence, but in some of the literature teacher competence is singled out as the key factor (Westera, 2001, Medley and Shannon, 1994, and Shulman, 1986). This study will highlight the importance of the relationship between teacher competence and pupil performance particularly in a situation where resources are very limited and where many factors contribute to the inadequate performance of pupils.

To achieve a high quality of education in the era of *Education for All* is not an easy task. In order to give access to education to the whole population the state needs to build and develop many schools, to supply a large numbers of teachers, and to provide the related educational resources; and as Kanu (1996, p.180) asserts “apart from the quantitative dimension, the qualitative dimension is also staggering in its proportion.” A very high proportion of teachers at primary and secondary school level have no professional teaching qualifications, many of them not being educated beyond secondary school level. Conducting a study in Pakistan, Kanu found that there was no observable difference in quality between trained and untrained primary teachers and, given the very low salaries paid to teachers, there tended to be no immediate desire among unqualified teachers to improve themselves academically or professionally.

This fact is confirmed by Boehme, Chiau, Matevele and Otto (1991) when they show that in some Maputo schools there is no significant difference between trained and untrained teachers in terms of student achievement, when taking into account the very low level of teacher training. However, some differences in the repetition rate in terms of teacher experience can be noted. This situation is explained by Dzvimbo and Lima (1994, p.33) when they argue that in Mozambique primary schools, teacher trainers lack experience of teaching in primary schools and that consequently there is an over-emphasis on content knowledge in teacher training courses instead of a balanced curriculum which incorporates both content knowledge and pedagogy. This imbalance could be the reason for teachers following the methodology in the teachers' guide without any change or adaptation, as they have little pedagogical or methodological foundation on which to draw.

A study conducted by Miguel and Barsaga (1997, p.120) considered factors affecting pupil performance, investigating the variables of teacher, student, parents and community, and concluded that the teacher was the key factor in student achievement. The quality of education depends on the quality of teachers, particularly in the initial stages of education when the pupils are at an early age, and especially in the rural areas (Châu, 1996, p.116). If that is so, then the quality of primary school teachers, both academic and professional, cannot be overly emphasised. Training plays an important role in improving the quality of education in schools. The professional quality of the trained teacher depends on the quality of the curriculum to which the teacher was exposed and the ways in which it is implemented.

In Mozambique, the teachers in the upper primary or second grade (EP2) generally have little academic and professional training, as is indicated in the SACMEQ II study (2003). A similar situation prevails in Pakistan, as documented by Kanu (1996). Kanu notes that in these circumstances teachers have serious limitations in actively participating in the successful implementation of new curricula or methods (p.180).

For these reasons, realising the importance of teacher quality in improving the quality of education, countries like Taiwan have prioritised teacher education in their educational reform (Fwu and Wang, 2002). In considering what constitutes teacher quality Fwu and Wang (2002) state that teacher training should develop content knowledge, pedagogical skills, the ability to reflect and to empathise, managerial competency, commitment, moral conduct, the ability to adjust and improvise, the capacity to collaborate with other teachers, the ability to advance the profession of teaching, and to contribute to society at large. In addition, they suggest that the quality of a teacher should ultimately be evaluated in terms of his/her impact on the quality of his/her students.

Pearlman and Tannenbaum (2000) also discuss the issue of evaluation of teacher quality, and they suggest that the evaluation system must take into account teacher education, teacher performance and student achievement. Dimmock (1990) identifies the three major elements that need to be evaluated in assessing the quality of the provision of education: the teacher/educator, the student/learner, and the curriculum and he stresses that curriculum change can enhance quality in education. He defines "quality in education" as involving one or more of the following elements:

- Improving the standards of teaching and teachers' performances;
- Improving the standards of learning and learners' performances; and
- Providing a curriculum more relevant to client needs (Dimmock, 1990, p.201).

Presently, the aim of the Ministry of Education and Culture (MEC) in Mozambique is to improve all three aspects: the teachers' performance, the learners' performance, and the curriculum. It is hoped that improving the quality of all three of elements will simultaneously improve the quality of education.

Research has shown that the nature of teacher training in Mozambique, with its many models and its poor training, has resulted in a dearth of competent teachers, particularly in reading and mathematics, and that this dearth has had negative consequences on the quality of education (Boehme, Chiau, Matevele and Otto, 1991, Dzvimbo and Lima, 1994, and Passos, Navesse and Chiau, 2000). "Teachers at all levels are often under qualified for the posts they hold" (MINED, 1998). The MEC thus recognises that the quality of education and teacher training provided in institutions go hand in hand. The quality of education is normally measured by pupil performance in their tests, and pupil performance is related to teacher competence and teacher performance in the classroom.

The purpose of this study is to investigate the effect of teacher competence on pupil performance in upper primary schools in Mozambique and other SACMEQ countries, drawing on data collected for the SACMEQ II study. Three main questions direct this investigation:

1. *What is the relationship between teacher competence and pupil performance in reading and mathematics in upper primary schools in Mozambique?*
2. *How does the relationship between teacher competence and pupil performance in mathematics and reading compare across the different Southern Africa Consortium for Monitoring Educational Quality (SACMEQ) countries?*
3. *What are the main predictors of pupil performance in reading and mathematics in Mozambique and in other SACMEQ countries?*

The objectives are to:

- Give information about teacher competence and pupil performance in upper primary schools in Mozambique;
- Give information about teacher competence and pupil performance in upper primary schools in SACMEQ countries;
- Identify the main predictors of pupil performance in reading and mathematics in Mozambique and in other SACMEQ countries;
- Make a contribution to the intellectual debate on competence, performance and the relationship between teacher competence and pupil performance.

1.3 MOTIVATION FOR THE STUDY

The MEC recognises that the quality of education and teacher training provided in institutions is often poor. "Teachers at all levels are often under qualified for the posts they hold. Nearly a quarter of all teachers in EP1 are entirely untrained, and the majority have received only six years of schooling and one year of professional training" (1998, p.9). For these reasons, the MEC has defined expanding access to education, improving educational quality and sustaining expansion and improvement as priority activities particularly where teacher training is part of the programme. Teacher training has been considered a burning issue for the last 30 years, but no clearly developed policy for teacher training has been developed to date (see Chapter 2, Table 2.4).

Many factors are involved in pupil performance and teacher competence, such as the pupils' background, the condition of the school, the parents' education, and the availability of textbooks to support the learning. However, the most important variable, as shown by some researchers, is the quality of teacher training. For many years improving the quality of education has been an important issue for the Ministry of Education (MINED) in Mozambique, especially in Primary Education (Grades 1 to 7), and improving the quality of education remains one of the aims of the MINED strategic plan. Despite these efforts some problems have remained, such as poorly trained teachers, the limited availability of materials, and a weak budget framework that does not comprehensively cover the needs of education in the country. The high incidence of repetition and dropout indicates the low achievement in primary schools, as identified by Reimers (1997). Improving the quality of basic education seems to be at the forefront of the national education agenda, as evidenced by several actions that have already taken place, such as the transformation of the curriculum for basic education, a new teacher training strategy, improving access, and capacity building (MINED, 1998).

The Ministry of Education and Culture has carried out many studies in the area of teacher training institutions and performance in lower primary schools. Unfortunately, it does not have the same information about upper primary schools (EP2). The Ministry has introduced new curricula for upper primary teacher training without assessing the old ones, which means that policy is being implemented without an accurate and appropriate information base. This fact confirms the existence of what Reimers (1997) referred to as a significant problem: the practice of making education policy decisions without sufficient information on which to base the decisions – particularly in the area of teacher training.

1.4 SIGNIFICANCE OF THE STUDY

This dissertation should be particularly significant, as it is the first cross-national study conducted in Africa using SACMEQ data (2000) in a secondary analysis. UNESCO have standardised the data and thus comparisons can be made between teacher competence and pupil performance, with special reference to competence in reading and mathematics across a variety of contexts and systems in SACMEQ countries.

As previously stated, many studies have been conducted in lower primary education (EP1) but not in upper primary schools (EP2). A contribution that this study might make is therefore the provision of useful practical information on upper primary education for the MEC, while contributing to the intellectual debate and the literature on the relationship between teacher competence and pupil performance. The study investigates teacher competence and its effects on pupil performance in a very specific setting taking into consideration the reality in Mozambique, including the contextual constraints and the stage of development. The study also examines teacher competence and pupil performance across SACMEQ countries, which have diverse histories, cultures, and education and economic systems.

A further contribution of this study is the attempt to assist curriculum development specialists and national policy makers who design teacher-training policy for upper primary schools. The study provides a model of competency which could be used as a basis for the development of teacher-training policy and the design and implementation of a teacher-training curriculum. The study also provides an integrated approach model for developing teacher competence in teacher training institutions. It is hoped that the development of this model will also be a contribution to the literature on how to develop teacher competency in teacher training institutions.

1.5 RESEARCH APPROACH AND DESIGN

This study adopts a quantitative approach which “is one in which the investigator primarily uses post-positivist claims for developing knowledge (i.e., cause and effect thinking, reduction to specific variables and hypotheses and questions, use of measurement and observation, and the testing of theories), employs strategies of inquiry such as experiments and surveys, and collects data on predetermined instruments that yield statistical data” (Creswell, 2003, p.18). This quantitative research approach was implemented by collecting data using predetermined instruments and tests that yielded statistical data for the SACMEQ study of 2000. The instruments included closed-ended questionnaires for teachers, pupils and school heads as well as tests in reading and mathematics for teachers and their Grade 6 pupils.

The data was analysed using the Statistical Package for the Social Sciences (SPSS) software package. A Multivariate Regression Model (MRM) was applied to analyse the variation of pupil performance explained by all of the predictors. The study identifies the main predictor for pupil achievement. With these results, it was possible to understand to what extent the data and the relationships are explained by the conceptual framework. The descriptive statistics (described in Chapters 6, 7 and 8) include a correlation matrix (reported in Chapter 9) to provide initial relationships for further analysis of the effect of teacher competence on pupil performance.

The data was analysed in two parts: the first part involves univariante descriptive analysis and the second part involves bivariate correlations and partial correlations analysis such as correlations between pupil performance and teacher profile and schools conditions. Multiple regression analysis was undertaken of the teacher profile (teacher knowledge, professional training, academic level and teacher experience), and school conditions as factors influencing teacher performance (including pupil achievement scores on SACMEQ tests as a proxy of teachers’ performance) at provincial, national and regional level.

In summary, the data analysis was performed in three stages. In the first stage, the data was weighed and aggregated by school, and then PCA was used to develop proxy variables for the domains in which there are no indexes on the database. In the second stage, the analysis began with basic statistics (correlations) related to pupil performance and their background. Finally, the regression model was developed in the third stage, using the multivariate regression equation to determine to what extent the empirical evidence supports the conceptual framework. Findings are presented in all three of the stages with the Mozambican results being followed by comparisons between Mozambique and other SACMEQ countries.

1.6 THE LIMITATIONS OF THE STUDY

One of the limitations in this secondary study is the fact that data collected in 2000 was used for analysis in 2007. Many features could have changed in the four years. Another limitation is related to the SACMEQ countries, where different countries have different systems. Mozambique in particular has a very different history, system of education and official language. (Portuguese is a language of instruction from Grade 1.) This language makes it impossible to compare the performance of pupils from different countries in the region.

According to the literature review, the best ways of measuring teacher competence are classroom observation and knowledge testing. But, because this thesis is a secondary study, it was not possible to observe classes.

1.7 STRUCTURE OF THE THESIS

This section gives an outline of the study, describing the aim and contents of each of the ten chapters of this thesis. The aim of **Chapter 2** is to provide background information about Mozambique and its educational system, which will contextualise the data analyses and interpretation of data presented later in the thesis. Firstly, information about the general characteristics of the country is provided, including its political history, geographical features, administrative divisions and population characteristics. Secondly, a general overview of Mozambique's education system, itemised as its historical development, its key features and the challenges it faces, as well as its teacher training polices and practices, is given.

The general information that is presented in Section 3.1 of **Chapter 3** is a reflection of the state of the art in the understanding of teacher competence. In Sections 3.2 and 3.3 the notion of competence in the field of teacher training is presented and discussed which is followed by a consideration of competence as part of teacher effectiveness in Section 3.4. Section 3.5 deals with the assessment of teacher competence, Section 3.6 explains the relationship between teacher competence and pupils' performance, Section 3.7 present pupil performance in cross-national studies in reading and mathematics, and the chapter is summarised in Section 3.8.

The purpose of **Chapter 4** is to give an overview of cross-national studies such as Progress in International Reading Literacy Study (PIRLS), Programme for International Student Assessment (PISA) and Third International Mathematics and Science Study (TIMSS), and to describe the impact and the main characteristics of the SACMEQ study in Mozambique. The chapter goes on to describe the crucial design and methodological issues involved in the implementation of the

SAQMEC study, namely, the planning of the study, instruments construction, sampling, data collection, data entry and data cleaning.

Chapter 5 describes the purpose of this study, which is to investigate the effect of teacher competence on pupil performance in upper primary schools in Mozambique and other SACMEQ countries. Three main questions direct this query. Each of the questions is derived from and related to the variables in the conceptual framework (see Appendices 3 and 54) illustrated in Figure 5.1. To answer Research Question 1 would entail providing information related to the quality of education in Mozambique in terms of teacher competence and its relationship to pupil performance, where the overall results are described by province and then nationwide. The results pertaining to Research Question 2 are described by country and region, and consideration of Research Question 3 provides information about the main factors influencing education quality in Mozambique and other SACMEQ countries in terms of teacher competence and its relationship to pupil performance.

In order to facilitate the development of policy at the Ministry of Education and Culture, the results are presented for reading and mathematics respectively, for the Mozambican provinces firstly and then for Mozambique, at the national level, compared with other SACMEQ countries.

The general information presented in **Chapter 6** covers the Mozambican and regional teacher characteristics (specifically age, gender, academic level, professional training and socio-economic status) and teacher job satisfaction, which are described in Section 6.1. The pupils' background and the problems they encounter in Mozambique and in other SACMEQ countries are presented in Section 6.2. The summary is presented in Section 6.3.

Chapter 7: the Mozambican and the regional internal teaching context (the availability of sitting/writing places, a teacher's table, a teacher's chair, bookshelves and classroom equipment such as a chalkboard, a dictionary, maps, a book corner, and teacher guides) is presented in Sections 7.1 and 7.2. The Mozambican and the SACMEQ external teaching contexts (in terms of education resources, the condition of buildings, the number of classes and pupils, and the nature of tuition and leadership) are presented in Sections 7.3 and 7.4. Finally, the summary is presented in Section 7.5.

The aim of **Chapter 8** is to describe teacher and pupil performance in reading and mathematics tests in Grade 6 in primary schools in Mozambique and in the other SACMEQ countries. The performance of both the teachers and the pupils was analysed per province as well as nationally for Mozambique, and then on a regional level, incorporating all SACMEQ countries. Performance was also analysed by gender, socio-economic status and school location (urban and rural). The results presented in this chapter are based partly on the Mozambican report (Passos, Nahara, Magaia and Lauchande, 2005) and partly on further analysis conducted on the data from the SACMEQ database archive (2004). Summaries are presented as a preliminary step in the background information for further analysis in Chapter 9.

The purpose of **Chapter 9** is to provide information about the main factors which explain the pupil performance variation in Mozambique and other SACMEQ countries, and their relationship to teacher competence. Multivariate Regression Model (MRM) was used to analyse to what extent the pupil performance variation is explained by various domains described in the conceptual framework, as described in detail in Chapter 5, Section 5.3. The results are presented, starting with exploratory statistics such as bivariate correlations between pupil performance and each domain and construct within the conceptual framework, as was elaborated in Chapter 5 (see Figure 5.1).

Chapter 10 presents and discusses the findings of the study. Section 10.1 gives an overview of the context of the study, which is followed by a summary of the research questions and results, while methodological, substantive and scientific reflections on the study are presented in Section 10.2. Conclusions and recommendations relating to the main factors influencing pupil performance in Mozambique and in other SACMEQ countries in upper primary schools are presented in Section 10.3, and the study concludes with recommendations for further research in Section 10.4.

CHAPTER 2

THE SCHOOLING SYSTEM IN MOZAMBIQUE

INTRODUCTION

The aim of this chapter is to provide background information about Mozambique and its educational system, which will contextualise the data analyses and interpretation of data presented later in the thesis. Firstly, information is provided about the general characteristics of the country, including its political history, its geographical features, its administrative divisions, and the characteristics of its population. Secondly, a general overview of Mozambique's education system, describing its historical development, its key features and the challenges it faces, as well as its teacher training polices and practices, is given.

2.1 THE MOZAMBICAN CONTEXT[2]

The Republic of Mozambique is located in the southeastern part of Africa and covers a geographical area of 799 380 square kilometres. The country is divided into eleven provinces, namely Cabo Delgado, Niassa, Nampula, Tete, Zambézia, Manica, Sofala, Inhambane, Gaza, Maputo Province and Maputo Cidade. These provinces are shown in Figure 2.1.

[2] The information included in this chapter is extrapolated from the Mozambican SACMEQ report (Passos, Nahara, Magaia and Lauchande, 2005, pp.1-9).

Source: Passos, Nahara, Magaia and Lauchande, 2005, p.2

Figure 2.1 Provinces of Mozambique

According to the 2007 census (INE, 2008)**,** Mozambique has an overall population of 20 530 714 inhabitants. It is a predominantly rural country, with about 68.2% of the Mozambican population living in many small settlements located in areas that are difficult to access owing to the poor transport and communication network (INE, 2008). The 2007 census (INE, 2008) reports that 52.3% of the overall population are female. The population density is approximately 26 inhabitants per square kilometre with the capital, Maputo Cidade, comprising 5.4% of the total population of Mozambique.

Mozambique is a multilingual country with 18 main Bantu languages (Sitoe and Ngunga, 2000) and many dialects. The official language is Portuguese but only about 30% of the population, who are mainly resident in urban areas, speak it. This language issue has had an impact on education, as Portuguese was the only language of instruction in schools until 2004. In 2004, the Ministry of Education and Culture (MEC) introduced the mother tongue as the medium of instruction, but initially this mother tongue instruction was introduced only in Grades 1 and 2 in some schools located in linguistically homogeneous zones. Apart from the language diversity of the country another factor to take into account is the gross illiteracy rate of 34.3% with the overall illiteracy rate amongst the female population being 66.7% (INE, 2006).

The country was a Portuguese colony from the fifteenth century until political independence from Portuguese rule was attained in 1975 after 10 years of bitter-armed struggle between FRELIMO and the Portuguese regime. Peace was interrupted once again during the early 1980s when the country experienced a civil war, which caused the loss of many lives and left a trail of destruction in its wake. After peace was again achieved in 1992, the infrastructure, ruined as a result of the trail of destruction left in the wake of the civil war, had to be rebuilt. The country has since undergone rapid socio-economic development.

In view of its political history and the impact that this situation has had on its people, it is crucial to outline the differences between the two different historical periods that Mozambique has experienced after independence. The first period, from 1975-1992, was characterized by a one party state, a socialist system of government and a centralised economy. This period was also marked by the occurrence of a bitter civil war. The second period, from October 1992 up until the present, is characterized in contrast by an open market (in a capitalist system) and a multiparty society.

The various school systems in the country, the teacher education system, and reforms introduced from time to time have been influenced by the Mozambican political system, particularly the socialist political system, a fact which is clearly illustrated in the policy of the National System of Education (SNE) introduced in 1983. Prior to 1983, of course, Mozambique's education system was made up of a number of different types of schools.

2.2 MOZAMBIQUE'S SCHOOL SYSTEM AND REFORMS

Before independence in 1975, Mozambique's education system consisted of missionary schools, public schools and private schools. The missionary schools catered for so-called "natives" (indigenous Mozambicans), and these schools were situated mainly in rural areas. The Government schools, which were located in predominantly urban areas, catered for Portuguese pupils and the "assimilados"[3] until 1962, when this limitation was cancelled and any pupils could attend the Government schools. The private schools, most of which were owned by the church, catered mainly for wealthy people.

[3] The "Assimilado" status was officially introduced in the governing system in 1917 through the Decree Law no. 317 and for the natives of the colonies to become full citizens (of their countries) they had to become Portuguese or manage to better assimilate the Portuguese language, culture and habits, thus becoming "Assimilados." To qualify as an "Assimilado" one had to meet such criteria as speaking Portuguese correctly, being able to read and write, to have a job and to evince "good" behaviour (in Sambo, 1999). The Portuguese considered their colonies as an integral part of Portugal. The "Assimilados" had full citizenship and the same status as the Portuguese in Portugal, and they could attend the same educational institutions, from primary school up to University (in Almeida, 1973).

All three different types of schools followed the same curriculum and sat the same examination, and the qualification certificates or diplomas had the same value. Pupils attending all three types of schools had to write examinations in the Government schools, and only the Government schools were allowed to issue certificates or diplomas. One of the characteristics of the pre-independence education system was that it was very selective in that only the pupils who successfully passed each grade were allowed to progress through the system, and pupils who were unsuccessful had to repeat the grade. This system has been retained in the post-independence education dispensation.

The National System of Education (SNE) was introduced in 1983 as part of the post-independence education system. It was the first system to be designed by Mozambicans themselves after the achievement of independence. The policy documents stated that the main goals of the education system were the eradication of illiteracy, the introduction of universal schooling, and the education of citizens for socio-economic, scientific, technical and cultural development needs (SNE, 1985, p.4).

The SNE document states that all citizens have a right to education, as education reinforces the leading role of the working class, and the alliance between the working class and the peasants, which is the main instrument for the creation of the new man, is based on national experiences and on Marxist and Leninist principles. It is to be managed, planned and controlled by the State, which is secular in character (1985, p.5 – Article 1).

With reference to teacher training, the Ministry of Education characterized the "new teacher" as a person who has a pedagogical and methodological qualification as well as scientific and technical qualifications aligned to the new values of the socialist system in place at that time. The goals for teacher training as defined by the MEC were to:

1. Ensure the integrated education of teachers, arming them with the scientific ideology of the proletariat, and thus enabling them to educate the youth and adults.
2. Instil in the teacher the profound patriotic and revolutionary conscience based on the revolutionary principles of the FRELIMO Party.
3. Consolidate the scientific and materialist view in the teacher.
4. Provide the teacher with pedagogic training based on a socialist pedagogy and adjusted to the demands of the Mozambican revolutionary process.
5. Allow the teacher to constantly elevate his level of political, ideological, scientific, technical and pedagogical training (SNE, 1985, p.5 – Article 1).

The SNE comprises five subsystems, namely General Education, Adult Education, Technical/Vocational Education, Teacher Training, and Higher Education (see Figure 2.2 for more details). The general education subsystem is organised into three levels which will be discussed in the next subsection. Pre-primary education, however, does not feature within these subsystems.[4]

[4] Pre-school education is provided in the crèches and kindergartens, usually under the administration of the Ministry of Health or private institutions. This education is not compulsory and is beyond the financial means of the majority of Mozambican citizens. As a result, only a small percentage of the target age group participates in formal pre-school education.

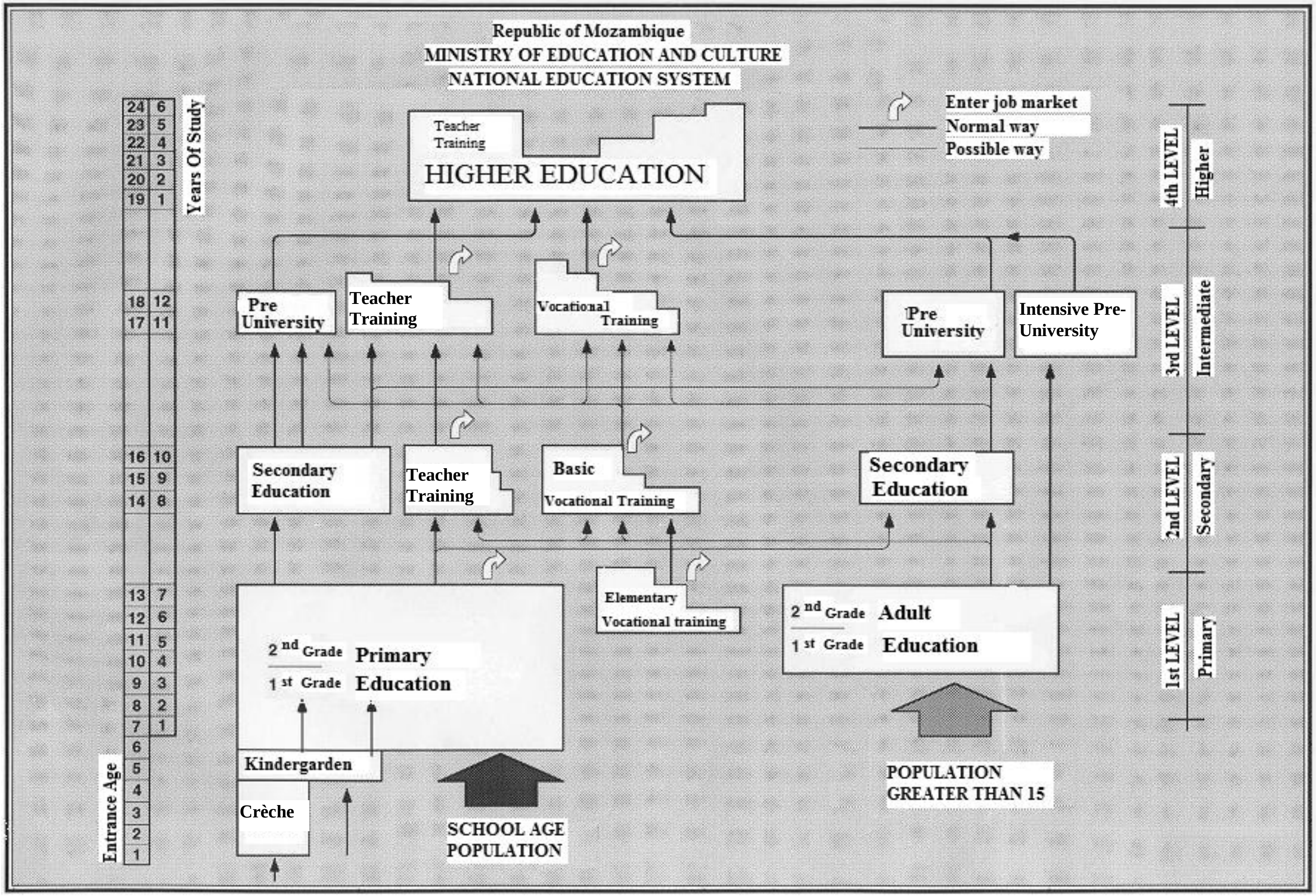


Figure 2.2 The Mozambican school system

2.2.1 General Education

General education is the backbone of the SNE, and is divided into three levels: primary, secondary and higher education.

Level 1 - General primary education

Primary education is free and compulsory in Mozambique for pupils from the official entry age of six years. It is subdivided into two levels, that is, lower primary education (EP1), which consists of five years of schooling (Grades 1 to 5), and upper primary education (EP2), which consists of two years (Grades 6 and 7). Usually primary schools operate in two time shifts, but due to the shortage of school places at this level, some primary schools need to operate using three shifts. After seven years of primary education, the pupils have a choice of enrolling for general secondary education, lower primary teacher training (to teach from Grade 1 to 5), basic technical and vocational education, or secondary education for adults.

Level 2 - General secondary education for adults

General secondary education is divided into two stages. The first stage, junior secondary, consists of three years (Grades 8 to 10). The second stage, senior secondary (also known as pre-university), comprises two years (Grades 11 and 12). Both levels of education are offered on the same premises. After three years of junior education, the pupils have a choice of enrolling for senior secondary education, middle primary teacher training (to teach from Grade 1 to 7), and the intermediate level of technical and vocational education.

Level 3 - Higher education

Public and private universities, higher institutes, schools of higher education and academies provide higher education to those who have completed Grade 12. There are two types of public universities that cater for post Grade 12 education. One is mandated specifically for teacher training for secondary school education, whilst the other focuses on science and other areas. Before independence, Mozambique had only one university, but after independence (1992), higher education expanded and there are now three Government universities and three private universities and institutions which provide higher education. Nevertheless, there is still a need for institutions of higher learning. As a result of the stiff competition for limited places at this level, all pupils have to sit an entrance examination.

2.2.2 Teacher Training

The lower primary school teacher training colleges (23), primary school teacher training institutes (11), and higher education institutions (1) were the main providers of teacher education. To qualify for entry into lower primary school (Grade 1-5) teacher training colleges, one has to hold a primary school certificate (Grade 7). Teachers who complete training in these colleges, teach in lower primary schools (Grades 1-5). In contrast, the entry qualification for primary school teacher training institutes is Grade 10. The teachers trained in these institutes can teach in both lower and upper primary schools (Grade 1-7), while teachers for both junior and senior secondary education are trained at universities.

2.2.3 Technical and Vocational Training

Technical and vocational training institutions equip students with skills that are required by industry and other sectors of the country's economy, and chiefly prepare the workforce needed for the social and economic development of the country. There are three types of vocational school. The first type offers courses for the commercial field (e.g. accountants and secretaries), the second offers courses for the industrial field (e.g. mechanics, welders and electricians) and the third offers courses in the agricultural field. Each type offers courses at two different levels, a basic and an intermediate level, each with a duration of three years. The basic level course is offered at technical and vocational schools whereas the intermediate level course is offered at technical and vocational institutes. Graduates from the institutes can attend universities in the same fields of study.

2.2.4 Educational Policy and Policy Reforms since 1995

Within the context of its overall development strategy, in 1995 the Mozambican Government adopted the National Education Policy, which established the policy framework for the National Education System. The National Education Policy identified the Government's main goals with regard to the education system as a whole, and defined specific policies for every sub-sector within the system.

While acknowledging that various educational needs have remained unfulfilled in the country, the Government nevertheless also recognised that the scarcity of financial and human resources would not allow all of the needs to be addressed at once. The National Education Policy therefore identified basic education (Grades 1 to 7) and adult literacy as the topmost priorities of the Government.

In its Strategic Plan for Education, the Ministry of Education (1998) stressed the priorities identified in the National Education Policy, amongst these goals being the increase of Mozambicans' access to basic education. The Strategic Plan for Education outlined the Ministry's fundamental objectives for basic education and identified the means by which the Ministry and its partners intended to move to accomplish them. The Strategic Plan for Education was rooted in a vision of an education system that was responsive to the needs and expectations of Mozambican citizens, and that was more closely aligned with the needs and requirements of the country's economy. The three main objectives of the education system proposed by the Strategic Plan for Education were:

- To increase access and educational opportunities at all levels of the education system for all Mozambicans;
- To maintain and improve the quality of education; and
- To develop an institutional and financial framework that would sustain Mozambican schools and pupils in future.

The central objective of the Strategic Plan for Education was to make access to primary education available to all Mozambican children. Additional objectives included improvements in the quality of basic education and in the establishment of a sustainable, flexible, and decentralised system in which responsibility would be widely shared with those who work at lower levels of the system and those whom it serves.

In order to improve the quality of education, the Ministry of Education and Culture has, since 1997, undertaken a process of curriculum transformation for basic education. The target year for the introduction of the new curriculum was 2004. Curriculum reforms in the secondary, technical and vocational and teacher training are also taking place. Another relevant change for improving quality has been the changes in the production of textbooks with the development of the National Book Policy, which involved the private sector in the process. This policy was expected not only to enhance the provision of books but also to ensure that the books were more responsive to the context of education in Mozambique.

2.2.5 The Administration of School Education

The Ministry of Education and Culture assumes overall responsibility for the administration of all public education institutions in Mozambique. The Minister of Education and Culture, the two Vice Ministers and the Permanent Secretary are at the apex of the Ministry. The Ministry of Education and Culture comprises nine national directorates:

- The National Directorate for Finance and Administration;
- The National Directorate for General Education;
- The National Directorate for Technical and Vocational Education;
- The National Directorate for Adult Education;
- The National Directorate for Human Resources Development;
- The Inspectorate;
- The National Directorate for Planning and Cooperation;
- The National Directorate for Culture; and
- The National Directorate for Special Programmes.

There is a Provincial Directorate of Education and Culture for each of the eleven provinces and this directorate falls under the leadership of a Provincial Director. Below the Provincial Directorate there is the District Directorate headed by a District Director for each of the 146 districts in Mozambique. Beneath the District Directorate, there is the school which is headed by a School Director. The inter-relationships amongst these role players at various levels are outlined in Figure 2.3.

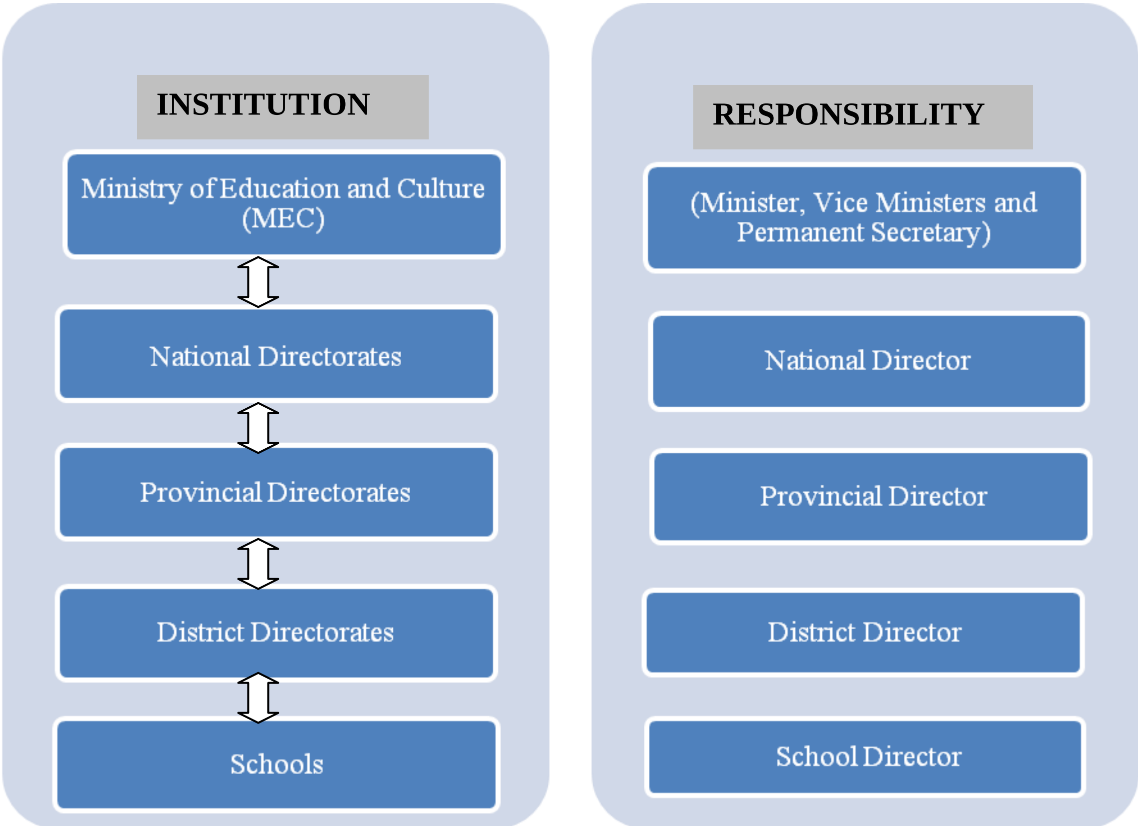


Figure 2.3 Levels of management and responsibility in the Ministry of Education and Culture

Five institutes report to the MEC, namely:

- The National Institute for Educational Development,
- The In-Service Teacher Training Institute,
- The Language Institute,
- The Adult Education Institute, and
- The National Institute for Cinema.

All national directorates and institutes fall under the leadership of the Minister within the Ministry of Education and Culture, and all are based in Maputo.

2.2.6 The Financing of Education

One of the fundamental challenges facing the Mozambican education system is the cost of expanding access and improving quality. According to the MEC (2003), education expenditure increased by 15% between 1999 and 2001. The Government has increased education's share of public expenditure from 18% to 20% in the same period.

2.2.7 The Gross Domestic Product (GDP)

In 2001, Mozambique spent the equivalent of 3.4% of its gross domestic product (GDP) on education. This is low in comparison with the average percentage in other developing countries, which spend about 3.9% of their GDP on education. The recurrent unit cost per Mozambican primary school pupil in 2001 was US$28 whereas the average recurrent unit cost for sub-Saharan Africa was US$143 (Passos, Nahara, Magaia and Lauchande, 2005).

Education has been the single largest category of recurrent investment expenditure, after road construction and maintenance. Considering that increasing the salaries of civil servants, including teachers, is one of the Government's short-term priorities, the share of public resources devoted to education is set to increase significantly, because the majority of public sector workers are teachers. Nevertheless, maintaining all of the current expenditure levels is beyond the means of the Ministry of Education and Culture, and a large proportion of the annual budget is consequently paid for with funds from abroad.

The Government has a number of external partners, the most important of which include the Swedish International Development Authority (SIDA), the Canadian International Development Agency (CIDA), the Danish International Development Agency (DANIDA), the Netherlands and the World Bank. All have expressed their willingness to shift their assistance towards programme support for the implementation of the Strategic Plan of Education, which will be discussed later in the thesis.

In order to ensure the highest possible level of co-operation among external donors to education, the Ministry of Education and Culture convenes a meeting every year with representatives of the major financial and technical agencies involved in the sector. By so doing, the Ministry of Education and Culture is able to provide leadership and facilitate coordination among donors in the implementation of the Ministry's strategy.

2.2.8 The Main Policy concerns of the Ministry of Education and Culture

Three fundamental problems in the Mozambican education system are reported, and these affect all levels of the system and virtually all institutions at each level. The first concern is the limited access to education, the second is the poor quality of provision, and the third is the cost of expanding access and improving the quality of education (MINED, 1998). Each one of these is dealt with in greater detail below.

Limited access

Universal access to primary education was achieved shortly after independence, but enrolment dropped significantly in the subsequent years due to the economic crisis and the civil unrest experienced by the country. The gross enrolment rate in lower primary schools increased from 59% in 1988 to 92.1% in 2000. According to the MINED (2001) in 2000 there were as many as 7 072 schools for lower primary, but only 522 schools for upper primary. Consequently, only a small proportion of children were able to complete the full primary education cycle.

Opportunities are even more restricted in secondary and tertiary institutions and in technical and professional schools especially for girls and young women. In 2000 about 78 335 pupils were enrolled in 92 lower secondary (Grades 8 to 10) and only 3 316 in the 20 upper secondary schools (Grades 11 and 12). About 47% of pupils at this level were girls (Passos, Nahara, Magaia and Lauchande, 2005).

Quality of education

The quality of education provided in schools is perceived to be poor, as can be seen from the promotion rates, which have never been higher than 60%, the repetition rates, which have always been higher than 20%, and the dropout rates, which tend to be about 30%. This means that 25% to 30% of the pupils who annually attended EP1 were repeaters. Martins (1992) reported that out of every 1 000 pupils enrolled in the first grade, only 77 successfully completed lower primary school (namely Grades 1 to 5) without repetition. Hence, for EP1 pupils to graduate, it is necessary to invest five times more than should theoretically be needed.

At the lower primary level, the average pupil/teacher ratio was 65:1 in the year 2000 (MINED, 2001) but it seems that the decline of education at the lower levels affects the progress of the students throughout the following levels and thus the whole education system. For example, the percentage of gross school enrolment by level from 2000 (MINED, 2001) is illustrated below, showing the decreasing number of students who progress through the Mozambican education system:

Lower Primary (Grades 1 to 5)	88.4%
Upper Primary (Grades 6 and 7)	8.1%
Junior Secondary (Grades 8 to 10)	3.0%
Senior Secondary (Grades 11 and 12)	0.4%

In addition to the above concern, common basic learning materials are scarce in or absent from many schools, and the quality of the educational facilities is often poor. Moreover, a large proportion of teachers at all levels are under-qualified for the posts they hold. Nearly a quarter of all teachers at lower primary level are untrained, and the majority have received only seven years of academic preparation in schools and three years of professional training thereafter (MINED, 1998).

The structure and content of the primary and secondary curriculum is increasingly inappropriate for the economic and social changes that have taken place. The curriculum is rigid and prescriptive in orientation, allowing few opportunities for local adaptation. There is a general perception amongst the stakeholders that much of what is taught in primary schools is of doubtful relevance and practical utility. As a result, the Ministry of Education decided to initiate the Transformation of the Curriculum for Basic Education as a first step towards the improvement of the quality of education in 1997 (MINED, 1998).

Costs of sustaining reforms

The third problem that emerges is that of the cost of sustaining expansion and improving quality within the present budget of the Ministry of Education, as the budget is considered to be largely inadequate. Maintaining the current system, with all of its problems, is beyond the means of the Ministry and a significant share of the annual budget is consequently met with funds provided by external partners (MINED, 1998).

2.3 PUPIL'S AND TEACHERS' PROFILES IN SCHOOLS IN 2000

The purpose of this section is to give an overview of teachers' profiles, pupil enrolments and pupils' performance in reading and mathematics in 2000, the year in which the SACMEQ fieldwork took place.

2.3.1 Grade 6 Pupil Enrolments

In Mozambique, 75% of the Grade 6 pupils were in urban schools in 2000, primarily because the majority of the Grade 6 and 7 schools were located in urban areas (Passos, Nahara, Magaia and Lauchande, 2005, p.41). Taking into consideration the location of the schools and the number of schools for EP2, the majority of the pupils do not have access to Grade 6, as there are fewer schools for EP2 than for EP1, and the rate of repetition is very high. Chapter 6 of this thesis discusses the SACMEQ study (2005) which reveals that Mozambique has a very high percentage of repetition, with 78.2% of pupils having repeated a grade at least once. The high rate of repetition is one of the obstacles to progression through the education system.

As indicated in Table 2.1, the variation in pupil enrolment in the year 2000 ranged from 20 710 pupils in Maputo Cidade to 5 012 in the province of Niassa. Zambézia and Nampula have the biggest populations but nevertheless did not have the highest enrolment. In all provinces, the number of boys enrolled at the beginning and at the end of the year was higher than the number of girls enrolled during the same period. Table 2.1 also shows the numbers and percentage of pupils by gender in Grade 6 at the beginning and end of the year, and the dropout and failure rate in 2000. The failure rate was calculated in relation to pupils at the end of the school year.

Table 2.1

Numbers of Mozambican pupils in Grade 6 at the beginning and end of the year, dropout and failure rate in 2000

Provinces	At the begin of the year			At the end of the year			Drop out %	Repeat rate %
	Boys/Girls	Boys	Girls	Boys/Girls	Boys	Girls		
Cabo Delgado	6.308	4 245	2 063	5 906	4 095	1 811	12.2	28.9
Gaza	12.544	6 590	5 954	12 106	6 372	5 734	3.7	31.8
Inhambane	13.146	7 353	5 793	12 687	7 168	5 519	4.7	36.4
Maputo Cidade	20.710	10 137	10 573	19 676	10 081	9 595	5.0	37.9
Manica	8.521	5 698	2 823	8 059	5 404	2 655	6.0	35.7
Maputo Província	11.461	8 638	5 650	10 940	5 494	5 446	7.3	27.9
Nampula	16.201	11 557	4 644	15 359	11 024	4 335	5.2	33.1
Niassa	5.012	3 580	1 432	4 427	3 145	1 282	11.7	21.6
Sofala	10.592	6 569	4 023	10.067	6 332	3 735	5.0	33.5
Tete	7.597	5 045	2 552	6 836	4 518	2 318	10.0	24.6
Zambézia	15.161	10 874	4 287	13 595	9 872	3 723	10.3	36.0
Mozambique	**127 253**	**77 459**	**49 794**	**119 658**	**73 505**	**46 153**	**6.6**	**33.1**

Source: MINED - Direcção de Planificação, 2001

The dropout rate in Mozambique was 6.6% on average. Cabo Delgado had the highest rate of dropout (12.2%), despite having the lowest enrolment rate, followed by Niassa (11.7%) and Zambézia (10.3%). Gaza had the lowest dropout rate (3.7%). The repetition rate in 2000 was 33.1% on average, and varied from 37.9 % in Maputo Cidade to 21.6% in Niassa.

2.3.2 Grade 6 Pupil Performance

Table 2.2 below shows the numbers and percentages of pupils by gender that passed Grade 6 at the end of the year. The percentages were calculated in relation to pupils at the end of the school year.

Table 2.2

Numbers and percentages of Mozambican pupils who passed the Grade 6 school year

Province	Pass					
	Boys/Girls	%	Boys	%	Girls	%
CAB	4.202	71.1	2.905	70.9	1.297	71.6
GAZ	8.254	68.2	4.379	68.7	3.875	67.6
INH	8.070	63.6	4.660	65.0	3.410	61.8
MAC	12.219	62.1	6.120	60.7	6.099	63.6
MAN	5.182	64.3	3.591	66.5	1.591	59.9
MAP	7.893	72.1	4.100	74.6	3.793	69.6
NAM	10.272	66.9	7.397	67.1	2.875	66.3
NIA	3.471	78.4	2.482	78.9	989	77.1
SOF	6.694	66.5	4.367	69.0	2.327	62.3
TET	5.152	75.4	3.486	77.2	1.666	71.9
ZAM	8.700	64.0	6.311	63.9	2.389	64.2
MOZ	**80.109**	**66.9**	**49.798**	**67.7**	**30.311**	**65.7**

Source: MINED - Direcção da Planificação, 2001

The national boys and girls pass rate at the end of 2000 was 66.9%. Niassa had the highest pass rate for boys and girls (78.4%) while Maputo Cidade had the lowest (62.1%). The percentage of boys that passed was slightly higher than the percentage of girls: 67.7% and 65.7% respectively.

Taking the role of gender in performance into consideration, it is apparent that boys performed better than girls in most provinces with the exception of Maputo Cidade (60.7% pass rate for boys and 63.6% for girls), Cabo Delgado (70.9% pass rate for boys and 71.6% for girls) and Zambézia (63.9% pass rate for boys and 64.2% for girls). The percentage of boys that passed ranged from 60.7% in Maputo Cidade to 78.9% in Niassa. In the case of girls, the percentage ranged from 59.9% in Manica to 77.1% in Niassa.

Table 2.3 shows the levels of achievement in Portuguese and mathematics. The Mozambican grading system provides scores from zero to 20 marks. Pupils achieving less than 10 marks (9 or below), that is a percentage between 0 and 45%, fail the examination. Scores between 10 and 13 marks (50 to 65%) are considered satisfactory, while marks from 14 to 20 (66% and above) are considered very good.

Of the pupils that reached the end of the year, 25.8% failed Portuguese, as they achieved marks that ranged from zero to nine. More than two-thirds (68.8%) passed with scores between 10 and 13, which corresponds to a satisfactory level, whilst only 5.4% had good or very good marks in Portuguese. This percentage is confirmed by the SACMEQ II study (2005) tests, reported in Chapter 7, in which only a small percentages of pupils reached Level 7 (see Chapter 7) and none achieved Level 8, the highest level. However, the majority of pupils achieved a middle level position. The percentage of pupils that failed Portuguese in Grade 6 ranged from 30.2% in Zambézia to 19% in Tete province. Zambézia had the highest rate of pupils that failed, followed by Sofala (28.9%) and Inhambane (28.4%).

2.3.3 Grade 6 Pupil Performance in Reading and Mathematics

Overall, the majority of Mozambican pupils (68.8%) performed at a satisfactory level with marks between 10 and 13 for Portuguese as a subject.

Table 2.3

Achievement of Mozambican pupils in Grade 6 in Portuguese and mathematics in 2000

	PORTUGUESE						**MATHEMATICS**					
Prov.	**0-9**	**%**	**10-13**	**%**	**14-20**	**%**	**0-9**	**%**	**10-13**	**%**	**14-20**	**%**
CAB	1294	21.9	4189	70.9	423	7.2	1332	22.6	4129	69.9	445	7.5
GAZ	2901	24.0	8561	70.7	644	5.3	2932	24.2	8199	67.7	975	8.1
INH	3609	28.4	8002	63.1	1076	8.5	3671	28.9	7416	58.5	1600	12.6
MAC	5279	26.8	13175	67.0	1221	6.2	6138	31.2	12264	62.3	1274	6.5
MAN	2116	26.3	5656	70.2	286	3.6	2249	27.9	5229	64.9	582	7.2
MAP	2295	21.0	8203	75.0	442	4.0	2456	22.4	7620	69.7	864	7.9
NAM	4129	26.9	10626	69.2	604	3.9	4370	28.4	10336	67.3	654	4.3
NIA	892	20.1	3048	68.9	487	11.0	878	19.8	2785	62.9	764	17.3
SOF	2908	28.9	6763	67.2	396	3.9	2859	28.4	6602	65.6	605	6.0
TET	1300	19.0	5087	74.4	449	6.6	1208	17.7	5023	73.5	605	8.8
ZAM	4107	30.2	9020	66.4	468	3.4	4210	31.0	8695	64.0	690	5.1
MOZ	**30829**	**25.8**	**82332**	**68.8**	**6 497**	**5.4**	**32301**	**27.0**	**78298**	**65.4**	**9 058**	**7.6**

Source: MINED - Direcção da Planificação, 2001

Legend: 0-9 = Fail; 10-13 = Satisfactory; 14-20 = Very Good

The percentage of pupils that performed at the satisfactory level did, however, vary from 74.4% in Tete to 63.1% in Inhambane. In relation to the breakdown of pupils performing at a 'very good' level with marks from 14-20, the provincial percentage data ranged from 11% in Niassa to 3.4% in Zambézia.

In terms of performance in mathematics, 27% of all Mozambican pupils had marks that ranged between 0 and 9, 65.4% had marks between 10 and 13, while 7.6% of pupils had 'very good' scores of 14 to 20 marks. In comparison with their overall results for Portuguese, there were a higher percentage of pupils scoring at the lowest and highest levels in mathematics. The percentage of pupils who failed Grade 6 mathematics ranged from 31.2% in Maputo Cidade to 17.7% in Tete province. Maputo Cidade had the highest rate of pupils who failed mathematics, followed by Zambézia (31%) and Inhambane (28.9%). The percentage of pupils that performed at level 10-13 varied between 73.5% in Tete and 58.5% in Inhambane. In the level 14-20 range of marks, the percentage ranged from 17.3% in Niassa to 4.3% in Nampula.

Maputo Cidade is a large city and the pupils, generally speaking, had a higher socio-economic status than those in Cabo Delgado and Niassa. However, pupil results for the year 2000 in Portuguese and mathematics were not consistent with the usual tendency for pupils from large towns or higher socio-economic status, who tend to perform better than pupils from rural areas or with lower socio-economic status. Some provinces, such as Cabo Delgado and Niassa, presented higher marks in Portuguese and mathematics than Maputo Cidade. These results were also not consistent with the SACMEQ results (see Chapter 7), in which Cabo Delgado and Niassa had the lowest percentage in pupil success.

The MEC tests assess reading and grammar, while the SACMEQ tests assess reading competence but, even taking into consideration the different purposes of the two tests, the results cannot explain the difference in pupil performance.

2.3.4 The Profile of the Cohort of Teachers in Mozambique in 2000

The Ministry of Education and Culture has introduced many models of teacher training since 1975, as will be explained later. Table 2.4 shows the profile of the cohort of teachers in 2000, the year in which the SACMEQ fieldwork took place.

The Ministry of Education and Culture grouped teachers according to the level of entrance academic qualifications, that is, the level of general education achieved before entering a teacher training course. For instance, there are three levels of teachers namely: *Basic*, which comprises teachers who enter the teacher training college with Grade 5 or 7; *Middle*, which comprises teachers who enter the teacher training college with Grade 10; and *Upper*, which comprises teachers who enter the university with Grade 12. Only the middle group is qualified to teach in upper primary, Grade 6 and Grade 7, with the exception of middle group teachers with *Magistério Primário* (middle group) who are qualified to teach in lower primary from Grades 1 to 4.

Table 2.4

The profile of teachers in 2000 in Mozambique

Group levels of Teacher	**Professional training**	**Year 2000**								
		Course Characteristics			**Sex**					
		Entr. level	**Dur.**	**Gr.to teach**	**Male**	**Female**		**Total**		
					No.	**No.**	**%**	**No.**	**%**	
Basic Level	EHPP *	4	4	1-5	20	5	0.08	25	0.4	
	CFPP	7	2	1-5	145	18		163		
	CFPP	7	3	1-5	251	58	0.9	309	4.9	
Total					416	81	1.3	497	8.0	
	MP *	10	2	1-5	67	26	0.4	93	1.4	
Middle level	*EFEP*	8	2	6-7	346	74	1.1	420	6.7	
	UEM	10	2	6-7	16	2	0.03	18	0.2	
	IMP	10	2	6-7	421	114	2.3	535	8.6	
	IMP	10	3	6-7	1 104	397	6.4	1 501	24.1	
	IMAP	10	2	1-7	361	150	2.4	511	8.2	
Total					2 315	763	12.3	3 078	49.6	
	UEM	12	2	8-10	26	6	0.09	32	0.5	
High level	UEM	12	2	11-12	27	6	0.09	33	0.5	
	UP Bacharelato	12	3	8-12	62	26	0.4	88	1.4	
	UP Licenciatura	12	5	8-12	9	10	0.16	19	0.3	
Total					124	48	0.7	172	2.7	
	Physical Ed.	10	3	6-12	144	9	0.14	153	2.4	
Others	Other	-	-	-	126	42	0.67	168	2.7	
	Foreign	-		-	21	23	0.37	44	0.7	
	Untrained	-		-	1 861	230	3.7	2 091	33.7	
Total					2 152	304	4.9	2 456	39.5	
TOTAL					**5 007**	**1 196**	**19.2**	**6 203**	**99.8**	

Source: MEC - Direcção dos Recursos Humanos * Courses undertook before independence

Legend: Entr.=Entrance; Dur.=Duration; Gr.=Grade; EHPPE=Escola de Habilitação de Professores do Posto Escolar; MP=Magistério Primário; CFPP=Curso de Formação de Professores Primários (Primary teacher training course); EFEP=Escola de Formação e Educação de Professores; IMP=Instituto Médio Pedagógico; UEM=Univesidade Eduardo Mondlane; IMAP=Instituto do Magistério Primário; UP=Universidade Pedagógica; Bacharelato=Bachelor; and Licenciatura=Degree

As can be seen from Table 2.4 above, in 2000 Grade 6 was taught by 6 203 teachers of whom 5 007 were male and 1 196 were female. Some 2 091 of the teachers had no professional training and the others had different types of training as listed in the table. In 2000, the year of the SACMEQ study, the professional training in upper primary education varied from CFPP, which qualified teachers to teach in lower primary education, to “Licenciatura” (a degree) which prepared teachers to teach in secondary education.

The lower level - comprised teachers who have an academic qualification of Grade 7 and two to four years of training. This qualified them to teach in lower primary education from Grades 1 to 5. There were 497 teachers in this group, of whom 416 were male and 81 female. Teachers at this level were qualified to teach lower primary and are from:

1. EHPPE – Escola de Habilitação de Professores do Posto Escolar (Teacher Training School);
2. CFPP – Curso de Formação de Professores Primários (Primary Teacher Training).

However, because of the teacher shortage, some of these teachers taught in the upper primary grades, and they represent 8% of the total number of teachers in upper primary education. Given the low level of their qualification, teachers could have faced some problems in teaching the subject matter.

The middle level - comprised teachers who had an academic qualification of Grade 10 and two or three years of professional training. They were supposed to teach in lower and/or in upper primary education. For instance, teachers from:

1. MP (Magistério Primário) could teach from Grades 1 to 5;
2. IMAP (Instituto Magistério Primário) could teach from Grades 1 to 7;
3. EFEP (Escola de Formação e Educação de Professores) could teach from Grades 1 to 5;
4. IMP (Instituto Médio Pedagógico) could teach from Grades 6 to 7;
5. UEM (Universidade Eduardo Mondlane) could teach from Grades 6 to 7.

In the year 2000, this group consisted of 3 078 teachers, of whom 2 315 were male and 763 were female. These teachers represented 49.6% of the total number of teachers in upper primary education. Of these, 48.1% had specific professional training to teach in upper primary education.

The higher level - comprises teachers, who have “bacharelato” (bachelor) and “Licenciatura” degrees as professional qualifications and they are supposed to teach in junior secondary education and senior secondary education. For instance, teachers from:

1. UEM and Universidade Pedagógico (UP) (graduates) can teach from Grades 8 to 10;
2. UEM and UP (graduates) can teach from Grades 11 to 12.

Only 172 teachers, 124 male and 48 female, had higher qualifications. They are exceptional at this level, because there tends to be a lack of teachers with higher qualifications in secondary education. The presence of the teachers with a higher level qualification could be related to the schools’ being located in towns. In rural areas, they face problems related to their accommodation and the availability of electricity and water, and they prefer to stay in towns where the conditions are better than in rural areas. Those teachers represent 2.1% of the total of teachers in upper primary education. A further group comprises teachers, who have different types of professional training or none at all. In the year 2000, this group consisted of 2 456 teachers, of whom 2 152 were male and 304 female. Those teachers represented 39.5% of the total number of teachers in upper primary education and untrained teachers represented 33.1% of the total number of teachers in upper primary education.

The majority of teachers (3 218) does not have specific training for this level. This fact can be explained on the one hand by the several models of teacher training introduced by the MEC, and on the other by the fact that qualified teachers tend to leave the profession because of the poor level of job satisfaction. In noting the number of years of experience of teachers in the SACMEQ study, where teachers in Mozambique had on average only 9.9 years of experience, it seems that this occurrence could be explained.

There was a major imbalance in terms of gender among upper primary school teachers. One of the reasons appears to be the location of the teacher training colleges and the upper primary schools. These institutions of education are usually located in cities or small towns, as suggested by the following statement: “Pupils graduating from lower primary schools had to go to other areas to continue with their education. Usually, parents are reluctant to send their girl children to hostels since the conditions in most hostels are unfavourable. In general, buildings are in bad condition and they frequently have poor sanitary conditions, are overcrowded, have poor dietary provisions and are poorly supervised” (Passos, Nahara, Magaia and Lauchande, 2005, p.31), which suggests that conditions for girls to continue their education are unattractive, a fact that deters them from seeking access to tertiary education.

The teacher profile in 2000 is consistent with the profile presented in the Southern and Eastern Africa Consortium for Monitoring Educational Quality (SACMEQ) study carried out in 2000 and presented in this thesis in Chapter 6. That is, the average professional training that teachers had was 1.8 years in reading and 1.9 years in mathematics; 4% of reading and 2.7% of mathematics teachers had benefitted from primary education only, and only 0.3% of reading teachers received tertiary education.

The fact that teachers have low levels of qualification or are without professional training tends to contribute to pupils’ weak performance. Châu (1996, p.186) states that “classroom observations in the different countries show that certain teachers have an insufficient mastery of the subject matter they teach. In addition many of them lack the pedagogical know-how required for good presentation of the material,” a point reinforced by Shulman (1986) who discusses the importance of the development of pedagogical content knowledge.

Several issues were raised in some of the workshops conducted for Mozambican teachers to introduce a new curriculum project (2004). These issues included:

1. Teachers' understanding of the learning process;
2. The assessment of pupils' work;
3. Methodology; and
4. Language or terminology.

The fact that teachers perceive these elements to be areas of difficulty is seen as a consequence of different types of teacher training models applied to their training from time to time and the influence of expatriates from different countries with varied teaching experience and using different methodologies and languages. These factors also militate against teachers' being able to work as a team at school level.

2.4 TEACHER TRAINING POLICIES AND PRACTICES IN MOZAMBIQUE

The Ministry of Education and Culture has introduced many different models of teacher training in Mozambique since 1975. Table 2.4, illustrating the 2000 profile of Mozambican teachers, revealed that they had followed a variety of education curricula according to the period in which they had trained. The purpose of this section is to give an overview of the teacher training policies and practices in Mozambique. This information is presented for two reasons. The first is that it presents a context for subsequent analysis and interpretation of teacher performance presented in Chapters 7 and 8. The second is that a teacher's profile can be related to the teachers' performance.

2.4.1 Teacher Training Policies

There are two common reasons for curriculum change in teacher education. One is the need to conform with political changes and the other is the need to improve the quality of teaching. Changes were introduced in Mozambique in 1975 to adjust to new policies and goals in education, but in recent years, the main reason for change has been to improve the quality of education.

Mozambique had two systems of teacher training before independence. One of these was the "Escolas de Habilitação Formação de Professores do Posto Escolar" (EHPPE), a four-year programme for which the entrance requirement was Grade 4. This learning programme included academic subjects the purpose of which was to improve student knowledge to the equivalent of Grade 7, and professional training. The other was the "Magistério Primário," where the entrance requirement was Grade 10 and the training lasted for two years. Teachers from both courses were then equipped to teach in primary education from Grades 1 to 4.

Since independence, from 1976 onwards, the Ministry of Education and Culture has implemented many different teacher training models, but at present it does not have an ideal model for a teacher training programme. In 1976 the MEC transformed the EHPPE into the Curso de Formação de Professores Primários (CFPP's). From that point on, many variants of the model were produced, as shown below (Guro, 1997, p.50):

1. 1976: entrance Grade 6 and duration 6 months;
2. 1979: entrance Grade 6 and duration 1 year;
3. 1990: entrance Grade 7 and duration 3 years.

Graduates from these courses of teacher training were meant to teach lower primary school.

In 1978, the MEC discontinued the "Magistério Primário" and introduced a new course, the "Escola de Formação e Educação de Professores" (EFEP). The entrance requirement for this learning programme was Grade 8. It was later designated the "Instituto Médio Pedagógico" (IMP) and the entry requirement was increased to Grade 10. The duration of this course was three years. Teachers who were successful in this course could teach in upper primary education Grades 6 and 7. This course closed when the MEC established the "Instituto do Magistério Primário" (IMAP). In 1996, the MEC introduced a new course, the IMAP, for which the entrance level is Grade 10. It has a duration of two years, and graduates from this course can teach from Grades 1 to 7.

In the early years of independence the responsibility for defining policy and designing teacher training curricula lay with the National Directorate of Teacher and Cadre Training, then it moved to the National Directorate for Basic Education (DINEB), and since 1997 it rests with the National Institute for Educational Development (INDE).

In 1992, the Government changed some principles and goals in order to adjust the education system to the new political context, and stated that:

1. *Education is a right and duty for all citizens*
2. *The State allows the participation of other entities, including communities, cooperatives, businesses and private institutions, in the education process*
3. *The State organizes and promotes education*
4. *Public education is secular* (Boletim da *República* I série nº 19, pp.104-108).

The same document recommends as goals for teacher training that it:

1. *Ensures an integral education of teachers, empowering them to assume the responsibility of educating the youth and adults*
2. *Provides the teacher with solid scientific, psycho-pedagogic and methodology training*
3. *Allows the teacher to constantly elevate his level of scientific, technical and psycho-pedagogic training (Boletim da República* I série nº 19, pp.104-112).

Currently, Teacher Education takes place at the Lower Primary School Teacher Training Colleges (CFPP) and Primary School Teacher Training Institutes (IMAP).

2.4.2 Teacher Training Practice in Mozambique

When the National Directorate for Basic Education (DNEB) in 1990 was mandated by the Ministry of Education and Culture to guide and coordinate the design, development and implementation of the reformed teacher education programme for basic education, the DNEB organized a task force consisting of various stakeholders at central level to address the reform of pre-service teacher education. The majority of the stakeholder representatives had no training and experience in primary education or experience in teacher training.

The DNEB (1996, p.4) defined the goals for teacher training as:

1. *To develop a general culture which will enable the trainee to assume his or her role as a teacher.*
2. *To promote the acquisition of scientific pedagogic knowledge that is the basis for educative action.*
3. *To provide sound knowledge in theory and in primary education subjects.*
4. *To develop attitudes for intervention in different socio-educative contexts.*

The group defined three principles for IMAP teacher training (DNEB, 1996, p.4):

1. *Articulation between theory and practice seen from an integrated perspective.*
2. *Transparency and isomorphism in teacher training.*
3. *Innovation and research in teacher training.*

The IMAP programme was introduced in 1996 and was the most recent change in the teacher training programme and the first one to train teachers to teach from Grades 1 to 7. All applicants have to be at least 16 years of age and have a Grade 10 education, and all of them have to sit an entry exam. The course is a two-year full-time programme designed to prepare students to become competent teachers. The programme is structured into four semesters of 18 weeks each. However, the specialization for upper primary education is not clearly outlined in the policy document.

The evaluation of CFPP (Passos and Cabral, 1989) and IMAP (Passos, Navesse and Chiau, 2000) showed that there were problems in the implementation of the intentions of the policy at the colleges. For example, it is not possible to train a competent teacher for primary education without practical work in primary schools and with trainers who have had neither training nor experience in primary education. The MEC (1998, p.9) recognises that the quality of education and training provided in the institutions is often poor. "Teachers at all levels are often under qualified for the posts they hold. Nearly a quarter of all teachers in EP1 are entirely untrained, and the majority has received only six years of schooling and one year of professional training." For these reasons, the MEC defined as its priorities the expansion of access to education, the improvement of the quality of the provision of education, and the sustaining of these two programmes of action over a period of time, and where teacher training is part of this programme.

2.5 SUMMARY

Mozambique has had several models of teacher training since independence. The weakness of the education system can be attributed to some extent to the lack of a coherent teacher training policy. Because the decision-makers did not take into consideration the results of research in the teacher training field, the new policies and programmes have tended replicate the problems inherent in the previous policies and programmes.

Swarts (2002, p.10) highlighted that "policy failure can often be attributed to the view that implementation is separate from policy makers who, in general, underestimate the complexity and difficulty of coordinating the tasks and players involved in implementing programmes and policies." Swarts goes on to explain that in order for policy to be effective, "policy formation must be seen as a social and political process, as well as a task of technical planning and analysis" (2002, p.11).

The goal defined in the new policy in Mozambique is to develop in trainees the competency needed to teach in primary education. Hence, competency for the teaching profession or a level of teacher performance, which can be described and evaluated, should reflect identifiable knowledge, skills and attitudes, and appropriate personal attributes, within a specific curricular or professional area.

To reach the above-mentioned goals, the quality of primary school teacher training, both academic and professional, should be given great emphasis as training plays an important role in improving the quality of education. Swarts (2002) cautions that we need to take into consideration the many changes that have happened in teacher training and that “it is important to undertake a deeper analysis to identify the consequences of several changes in the teacher training programme” (2002, p.15).

The next chapter reviews the relevant literature in an attempt to find answers to the research questions with regard to teacher competence and its relationship to pupil performance in the Mozambican context, and an overview will be presented of pupil performance in reading and mathematics in cross-national studies such as the SACMEQ study.

CHAPTER 3

LITERATURE REVIEW

INTRODUCTION

A review of the relevant literature is presented and discussed in this chapter in order to be informed about previous studies, to identify gaps in the literature, and to address the issue of teacher competence and its relationship to pupil performance in the Mozambican context, In addition, pupil performance in reading and mathematics in cross-national studies is examined.

The review is informed by the main research questions for this study:

1. What is the relationship between teacher competence and pupil performance in reading and mathematics in upper primary schools in Mozambique?
2. How does the relationship between teacher competence and pupil performance in mathematics and reading compare across the different countries in the Southern Africa Consortium for Monitoring Educational Quality (SACMEQ)?

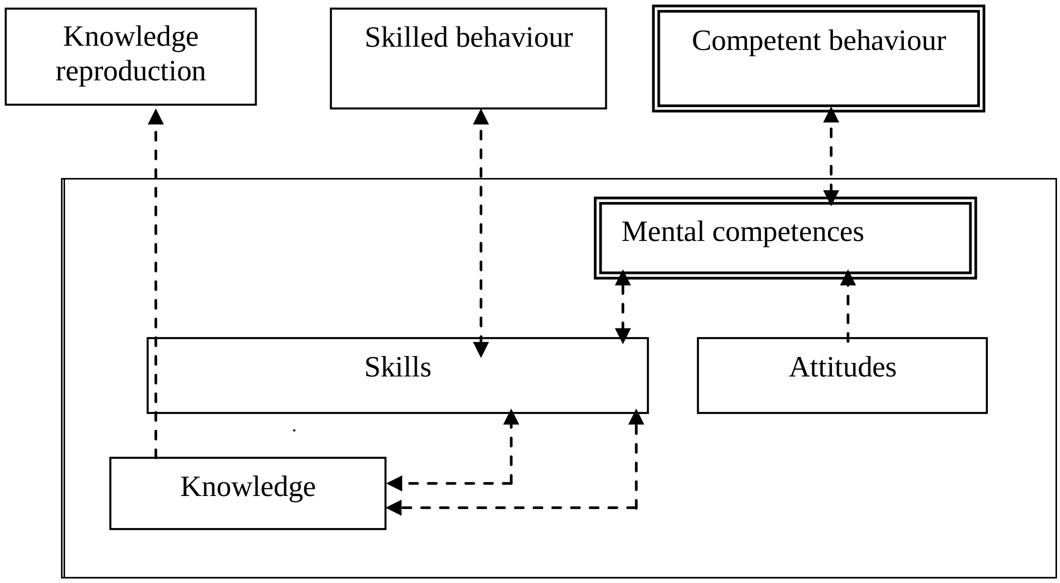
The general information that is presented in Section 3.1 of this chapter is a reflection of various ways in which teacher competence is understood. In Section 3.2, the thinking about competence in the field of teacher training is presented and discussed, followed by a discussion of competence as part of teacher effectiveness. Section 3.3 deals with the assessment of teacher competence, Section 3.4 has to do with the relationship between teacher competence and pupils’ performance, Sections 3.5 and 3.6 present pupils’ performance in cross-national studies in reading and mathematics, and the conclusion, Section 3.7, summarises the chapter.

3.1 UNDERSTANDING COMPETENCE

Competence is usually associated with highly professional performance and there is a direct link in the field of education between a teacher’s professional competence and pupil performance.

There are two distinct meanings of ‘competence’ in education. From a theoretical point of view, competence is understood as a cognitive structure that facilitates specified behaviours. From an operational point of view, competence seems to cover a broad range of higher-order skills and behaviours that represent the ability to deal with complex, unpredictable situations. This operational definition includes knowledge, skills, attitudes, metacognition and strategic thinking, and presupposes conscious and intentional decision making (Westera, 2001).

In Figure 3.1, Westera (2001) offers a schematic view of the common operational definition of competence.



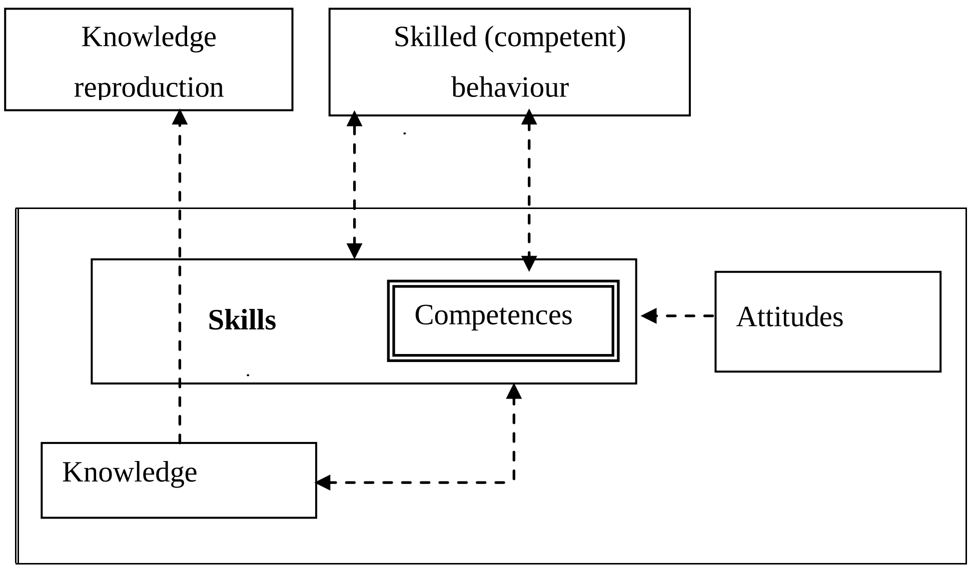
Source: Westera, 2001, p.80

Figure 3.1 A competence model, according to common definitions

The general concept of operational competence, according to Westera (2001), can be explained as follows: "An individual's cognitive structures contain considerable theoretical and practical knowledge. This knowledge can be made available to the outside world by way of reproductive skills (i.e. speech, writing, pointing, etc.), or can become supportive to skills and the associated skilled behaviour" (p.81). The same writer stresses that in complex non-standard situations, competences combine knowledge (or the cognitive), skills and specific attitudes. Competences have a mental component involving thought and a behavioural component involving competent performance. But our understanding of the true nature of competence should go beyond the aspects of knowledge, skills and attitudes, because something 'extra' seems to be necessary to ensure effective and efficient performance. Competent individuals should be able to make the right choice out of a variety of different possible behaviours by anticipating the effects of their intervention.

As Westera explains (2001, p.85) competence is a complex concept. Competence may be "decomposed" into contributing sub-competences. The sub-competences can be "decomposed" too and this process can go on, several times. The "decomposition procedure" results in a hierarchical structure of conditional sub-competences that become more specific and limited as one goes down the hierarchy. Eventually, there comes a stage in which the sub-competences are identical with the supporting skills. While maintaining the idea of skills as being different from competences, we should also acknowledge that skills themselves can also be "decomposed" into a hierarchical system of sub-skills.

According to the same author, there are two problems with this description of the concept of competence: Firstly, it tries to set cognitive standards for behaviours that cannot be standardized. Secondly, from a research point of view, competences make up a sub-category of cognitive skills; the idea of "competence" as a distinct category different from "cognitive skills cannot be sustained." Accordingly, the competence model of Figure 3.1 has been modified in Figure 3.2 below:



Source: Westera, 2001, p.86

Figure 3.2 Competences as sub-skills

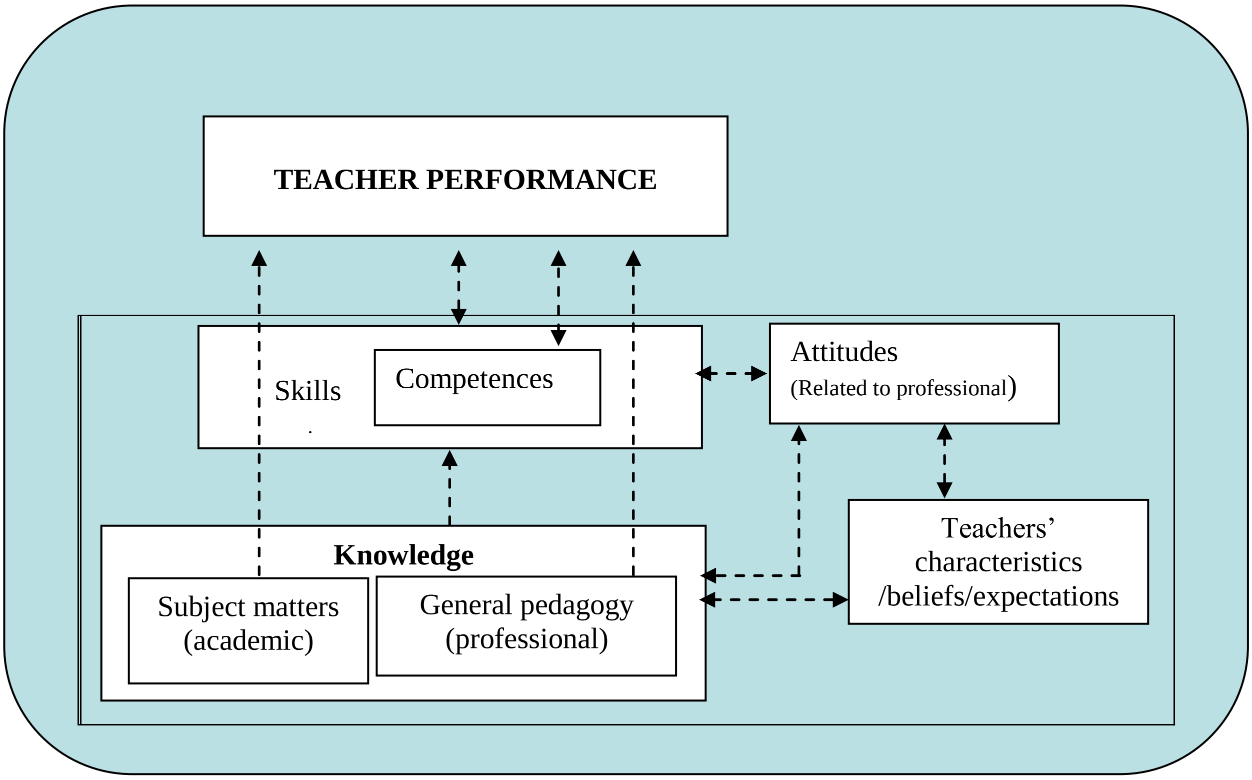
However, this debate about the description does not mean that the term competence should not be used. The term might also be reserved to indicate that the associated knowledge and skills originate from a professional practice. But when all is said and done the only determinants of human abilities are knowing (the cognitive), feeling (attitudes) and doing (skills) (Westera, 2001, p.87).

A number of authors describe competence as relating to an action, behaviour or outcomes that can be demonstrated, observed and assessed. According to Tomlinson (1995, p.181) "competence or skill signifies a more or less consistent ability to realise particular sorts of purposes to achieve desired outcomes." A competent person is capable of certain acts or actions. Such a person is capable of the actions required to achieve an intended outcome. The concept of competence, as explained by Westera (2001), is strongly associated with the ability to master complex situations, and goes beyond the levels of knowledge and skills to include an explanation of how knowledge and skills are applied in an effective way.

In a much broader sense, competence is a highly valued quality that accounts for the effective use of knowledge and skills in specific and concrete contexts. The mastery of relevant knowledge and skills alone is no guarantee of successful performance in complex environments. Individuals should be able to select from their available knowledge and skills in such a way that efficient and effective behaviour occurs which requires special "abilities" that take into account the characteristics of a specific context (Westera, 2001).

3.2 TEACHERS AND ISSUES OF COMPETENCE

A number of researchers such as Fraser (2000), Norris (1991), Short (1985) and Popham (1986) have proposed frameworks for domains of teacher knowledge. When one adapts Westera's model (2001) to the context of teaching the following diagram results:



Source: adapted from Westera, 2001

Figure 3.3 Competences as sub-skills in the teacher's context

In examining this diagram, it can be said that a teacher's performance depends on the teacher's knowledge, (comprised of subject matter and general pedagogy), which is directly linked to the teacher's competences, characteristics and attitudes. Grossman's (1995) explanation of teacher knowledge matches the adapted Westera model which means that teacher knowledge comprises subject matter and general pedagogy. Subject matter is vital for good teaching and teacher performance as "qualitative research suggests that teachers' knowledge of the content they teach affects both what teachers teach and how they teach it" (Grossman, 1995, p.6118). Subject matter then links with general pedagogy, which includes "knowledge about classroom organization and management, general knowledge of lesson structure, and general methods of teaching. Lack of professional training affects the level of teachers' performance" (Grossman, 1995, p.6118).

The above ideas are reinforced by a reading of Shulman (1986), who discusses three kinds of knowledge: content knowledge, pedagogical content knowledge (PCK), and curriculum knowledge. Content knowledge refers to "the amount and organization of knowledge per se in the mind of the teacher" (p.9). The author stresses that teachers must not only be capable of defining the content or concepts for learners, but they must also be able to explain why and how these concepts relate to other concepts or content, as well as be able to explain why a particular proposition is deemed warranted. The knowledge of pedagogical content goes beyond the knowledge of subject matter per se to the dimension of knowledge of the subject matter for the purposes of teaching. Finally, curricular knowledge is knowledge of the full range of the programmes designed for the teaching of particular subjects and topics at a given level, the variety of instructional materials in relation to those programmes, and the set of characteristics that serve as both indications and contra-indications for the use of particular curriculum or programme materials in particular circumstances (pp.9-10).

Medley and Shannon (1994) develop the concept of professional knowledge. They define professional knowledge as consisting of knowledge about the kinds of teacher behaviour which is known to be effective in helping students progress toward important educational goals. But they also indicate that other factors that affect the level of teacher performance in primary education are the levels of knowledge about the specific subject methods. Medley and Shannon (1994) emphasize the two components of teacher knowledge when they stress that "Competence to teach is defined in terms of possession of two kinds of knowledge, knowledge of subject matter and professional knowledge, and training programmes are developed to help students become competent in this sense" (Medley and Shannon, 1994, p.6020). Consequently, for improved teacher performance in primary education it is essential that such aspects as subject matter or professional knowledge and general pedagogy be considered for inclusion in the teacher training programme.

3.3 THE IMPORTANCE OF TEACHER TRAINING IN DEVELOPING PROFESSIONAL COMPETENCE

Many factors contribute to the quality of teaching, such as the professional competence of the teacher, which includes subject matter knowledge, pedagogical content knowledge, knowledge of teaching and learning, curricular knowledge, teaching experience, and certification status (Shulman, 1986, Grossman, 1995, Westera, 2001). Darling-Hammond's (1999) findings indicate a consistent and significant positive relationship between the proportion of well-qualified teachers and student achievement on the National Assessment of Educational Progress (NAEP) reading and mathematics assessment.

Teacher effectiveness depends on how well a teacher performs in the classroom, and this is dependent on how competent the teacher is. The literature (Chapman and Mählck, 1997, Kanu, 1996, Châu, 1996) emphasises the importance to the performance of the pupils of the quality of teacher who has well developed subject knowledge, pedagogical content knowledge and curriculum knowledge. In the Mozambican context, the nature of the learning outcomes depends on the level of teacher competence, and teacher competence depends in turn on the teacher training curriculum, the level of competence of the trainer, and that of the mentor at the school to which the teacher is assigned.

According to Chapman and Mählck (1997) pre-service training is "the single most widely employed strategy (by itself or with other strategies) to improve instructional quality. This comes as no surprise. One of the most widely held beliefs underlying both national and international educational development activities is that the most direct and efficient way to improve instructional quality is to improve the content pedagogical expertise of teachers through increased levels of training." Shulman (1986) reinforces this idea by stating that all three types of knowledge, content knowledge, pedagogical content knowledge and curricular knowledge should be included in pre-service teacher training programmes.

Many researchers, such as Sander and Horn (1998) and Raudenbush, Eamsukkawat, Di-Ibor; Kamali and Taoklam (1993), confirm that teachers should clearly become the vanguard in the effort to improve pupils' performance. The Holmes Group study on educational reform (in Kanu, 1996) gave recognition to the importance of teachers in educational reform when it indicated that the quality of learning in schools depends on the quality of teachers with the crucial role of the teacher in bringing about meaningful educational change being acknowledged in developed and developing countries alike. It is the teacher who is the key to educational quality. Excellent curricula, materials, infrastructure and administration will not improve the quality of education if the quality of teaching is poor. Conversely, good results can be achieved with quality teaching even with poor curricula, materials or infrastructure. "Curriculum plans, instructional materials, elegant classrooms and even intelligent administrators cannot overcome the negative effects of weak teaching or match the positive effects of positive teaching. The entire formal and informal curriculum of the school is filtered through the hearts and minds of classroom teachers, making the quality of school learning dependent on the quality of teachers" (Holmes Group, 1986, p.2323 in Kanu, 1996, p.174). This aspect is particularly important in the Mozambican context where, even if the infrastructure is lacking and resources are scarce, teacher competence could ensure the delivery of quality education (Alberto and Mahumane, 2000).

A survey carried out by Châu (1996) noted two things about the teachers surveyed. Firstly, the teachers had no training and as a result tended to use a traditional teaching approach that was teacher-centred and fairly rigid or even authoritarian. Secondly, the teachers surveyed did not have the levels of competence and motivation which were required in implementing progressive methods which favour pupil-centred learning, are based on discovery and consequently on the construction of knowledge by the pupils themselves. Currently, the recommendation is to use active methods centred on the child, because that is the best way to involve the child in his/her own learning. Participation of the students in their own learning will lead them to achieve the educational goals set by the curriculum. Research, however, has shown that teachers prefer to use expositive methods (teacher-centred methods) because a lack of training hinders the teacher in the implementation of active methods and the use of relevant teaching and learning materials.

A further important aspect is for teacher training programmes to demand reflection on values and beliefs about teaching (teaching philosophies) to find out whether these are in accordance with teaching practices. A teacher's attitude, which should be characterised by beliefs, expectations, strong motivation, clarity of exposition, a positive attitude, enthusiasm, interest in the children, availability to help children, intensity of interaction with pupils and structured teaching (organizational ability), needs to be investigated (Châu, 1996). The attitude of the teacher affects the teacher's performance, because even if he or she has high levels of professional training and subject knowledge, if the teacher has a negative attitude the students may not perform optimally.

Myint's (1999) study suggests the need for collaboration between teacher training institutions and schools in improving the quality of initial training, so that prospective teachers are equipped to meet the challenges they will encounter in schools and be prepared to address the needs of society when they become teachers. Shah (1995) suggests that when selecting the objectives and content of teacher education programmes, the principles of "policy goals and aims, characteristics and needs of prospective teachers, the roles expected of teachers and the findings gleaned from evaluation and research studies" should be taken into consideration. Ben-Peretz (1995, p.543) explains that the curricula of teacher education programmes are generally based on four components: subjects matter studies, foundations of education studies, professional studies, and practicum or supervised practice. In rare cases, the curriculum integrates subject matter studies with professional studies such as courses on teaching methods. However, the treatment of subject matter in a way that relates to pedagogic issues may yield more valid and useful knowledge for prospective teachers, with various authors (Shulman, 1986, Grossman, 1995, Medley and Shannon, 1994) considering them the essential components of teacher education curricula. In fact, although subject knowledge is essential for good teacher performance, including it in the training curriculum may overload the programme. The Foundations of Education component of the curriculum usually includes the history, philosophy and sociology of education, but needs to include the study of contemporary issues and educational policy as well as. The Professional studies component usually includes the methods courses, the curriculum courses, and courses based on knowledge generated through research on teaching while Practicum or supervised practice is the most favourably viewed component of teacher education in many countries.

In South Africa, for example, a publication by the Committee on Teacher Education Policy (DoE, 1996) presents the necessary competencies to be developed in teachers during training, arranged under the headings Knowledge, Skills, and Values. General competencies are related to knowledge, which is described as subject content, national, regional, and school curriculum policies, curriculum theory, the role of parents in the education process, the organized teaching profession, culture, religion and the community, and so forth. Competencies related to (classroom) skills include communication, methodology, classroom management and assessment; and values/ attitudes/dispositions are values related to the school and attitudes related to professionalism.

A number of researchers (Shulman, 1986, Westera, 2001, and Medley and Shannon, 1994) have proposed frameworks for the domains of knowledge which inform teacher training. Grossman's (1995, p.20) framework includes six domains: knowledge of content, knowledge of learners and learning, knowledge of general pedagogy, knowledge of the curriculum, and knowledge of the context, but knowledge of self is another important aspect to consider in teacher training.

Investing in human capital is the best way to improve the quality of education, and is the key to increasing the quality of achieving the education outcomes which is confirmed by Steyn (1999), who states that the efforts towards improvement of schools should focus on people improvement. He further states that investing in human capital is the key to effective improvement of the quality of schools. Programmes and materials do not bring about effective improvement, but the people in the education system do (Steyn, 1999). For instance, in Ministry of Education the results arising from a project supported by UNICEF and carried out in Gaza province in Mozambique (MINED, 1980) showed that improving school conditions without improving teacher training does not improve the quality of education. It was the evaluation of this project that informed the revision of the Mozambican teaching training programme.

3.4 COMPETENCE RELATED TO TEACHER EFFECTIVENESS

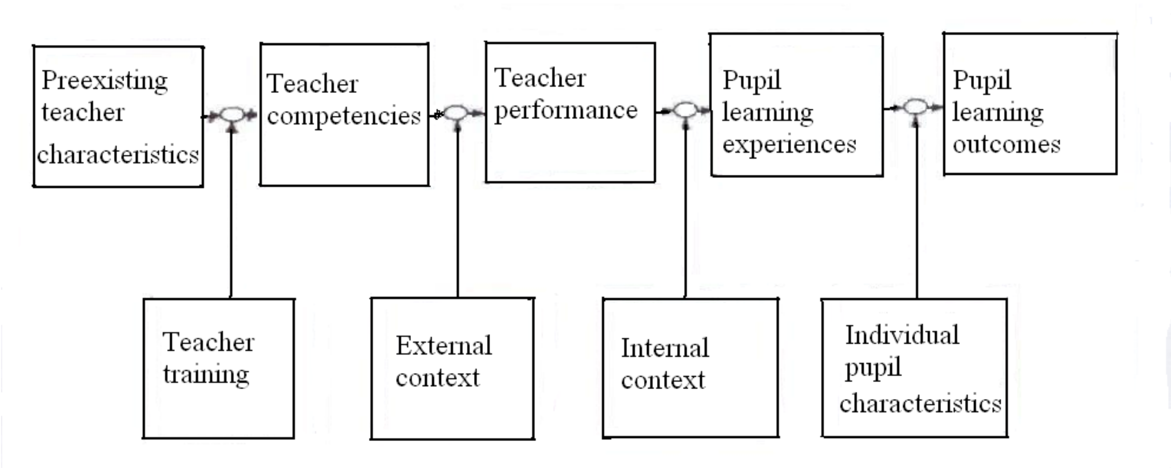
When thinking about competences, concepts such as performance and effectiveness are involved because competence is directly linked with effective performance in complex situations as it is thought to serve as a causal factor for success because "competent performance presumes competence" (Westera, 2001). Thus, three conceptual dimensions of teacher quality that are commonly used in making judgements about teacher's work, include teacher competence, teacher performance and teacher effectiveness. The first two dimensions have been discussed but teacher effectiveness refers to the results a teacher gets or to the amount of progress the pupils make toward some specified goal of education is defined in terms of what the pupils do (Medley, 1982, p.1894). There is a relationship between teacher competence and teacher effectiveness which determines teacher influence in pupil progress towards defined educational goals.

Effective teachers are those who achieve the goals they set for themselves or the goals set for them by others such as school principals, education administrators and parents (Anderson, 1991). Cheng and Tsui (1996) agree that understanding teacher effectiveness must be based on understanding the relationship between teacher competence, teacher performance and the set goals or expected educational outcomes. Effective teachers can thus be understood as those who possess relevant competence and use the competence appropriately to achieve their objectives (Cheng and Tsui, 1996).

Medley (1982) explains that the "structure of teacher effectiveness is a very comprehensive framework, which can integrate the teacher trait perspective, the teacher behaviour perspective and the process-product of teaching perspective to explain the relationships between teacher competence, student learning experience and educational outcomes" (1982, p.12). Medley's model will be discussed in the next subsection and then the Cheng and Tsui models.

3.4.1 Medley's Model of Teacher Effectiveness

Medley (1982, p.1899) proposes that the structure of teacher effectiveness should include nine important components as illustrated in Figure 3.4 below:



Source: Medley, 1982, p.1899

Figure 3.4 Medley's structure of teacher effectiveness

The five cells in the top row (on-line) define five types of variables, each of which has been used at one time or another as a criterion for evaluating the teacher. The four cells in the second row (off-line) define additional variables that affect the outcomes of teaching not controlled by the teacher. The arrows in the diagram indicate the flow of influence from one variable to the next. Each cell is joined by an arrow to the cell that it influences most directly (Medley, 1982).

Pre-existing teacher characteristics designates knowledge, abilities and beliefs that the teacher is expected to possess on entering into professional training. For the most part, these characteristics are stable personality traits (like general intelligence or interest in children) that are believed to be relevant to successful teacher performance but that a teacher education programme cannot and should not try to develop in students who do not already possess them (Medley, 1982, p.1895).

Teacher Competence refers to the knowledge, abilities, and beliefs a teacher possesses and brings to the teaching situation. These attributes constitute a stable characteristic of the teacher that does not change appreciably when the teacher moves from one situation to another (Medley, 1982, p.1894).

Teacher Performance refers to the behaviour of a teacher while teaching a class (both inside and outside the classroom). It is defined in terms of what the teacher does (Medley, 1982, p.1894).

Pupils' learning experiences refers to the behaviour of pupils while teaching is going on. This factor is not a teacher characteristic, but it has a great deal do with how effective the teacher is, since the amount a pupil learns depends on what the pupil does (what experiences he or she has). Any effect the teacher has on pupil learning must result from some effect the teacher has on the pupil's learning experiences (Medley, 1982, p.1894).

Pupil learning outcome is a direct result of pupils' learning experiences**.** Learning is, after all, something that pupils do, which a teacher facilitates by providing opportunities. When a teacher "teaches," what he or she really does is to try to provide certain learning experiences or opportunities for the pupils who are expected to develop the desired learning outcomes (Medley, 1982, p.1898).

Teacher training reflects the efforts of teacher educators or others to help a teacher to grow in competence - that is, to add additional competencies to his or her repertoire. The set of competencies a teacher has at the end of pre-service preparation is a mixture of pre-existing teacher characteristics and knowledge, abilities, and beliefs acquired during training (Medley, 1982, p.1899).

The **External teaching context** is the set of characteristics of the school in which the teachers works. The external context interacts with the competencies the teacher possesses to determine how well that teacher performs in that particular situation. The physical and support facilities in the school, the media and materials available to the teacher, and the relationship between the school and community are variables that belong in this cell (Medley, 1982, p.1900).

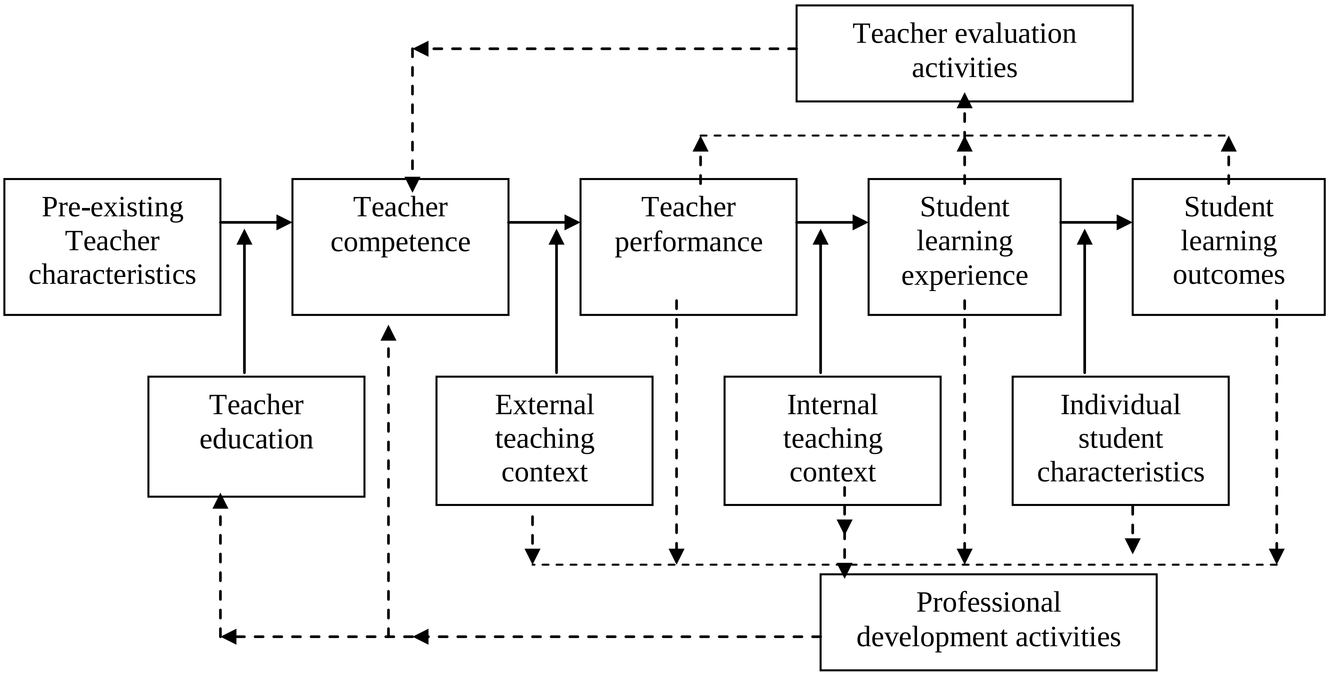
The **Internal teaching context** is the set of characteristics of the class taught by the teacher as a group. The internal context interacts with teacher performance in determining the learning experience pupils have in that classroom. Such variable as the class size, the average ability, heterogeneity, the ethnic composition and socio-metric properties (profiles) belong in this cell (Medley, 1982, p.1900).

Individual pupil characteristics are the characteristics of individual pupils that determine what learning outcomes result from any particular learning experience that a pupil might have. Two pupils will be affected differently by identical learning experiences because they differ in ability, interests, values, background and so on (Medley, 1982, pp.1984-1900).

In Medley's model as illustrated in Figure 3.4, the central issue of teacher competence is shown as emanating from inter-related components of teacher training, teacher characteristics, and teachers' performance, which ultimately has an effect on pupil outcomes. The model indicates that the quality of the teacher depends not only on the quality of training but also on the teacher's background or the teacher's pre-existing characteristics. The pupil's learning experience is influenced by the teacher's performance and the internal teaching context. Finally, pupil learning outcomes are a result of pupil learning experiences and individual pupil characteristics. Therefore, when discussing pupil outcomes it is necessary to take into consideration all of the components that affect pupil performance.

3.4.2 Cheng and Tsui's Models of Levels of Teacher Effectiveness

Two significant models built on Medley's work were developed to illustrate teacher effectiveness. In the first model Cheng and Tsui (1996) developed Medley's structure through the inclusion of two more components, namely teacher evaluation and professional development (in Cheng and Tsui, 1996, p.8), as shown in Figure 3.5 below:



Adapted from Medley: Source: Cheng and Tsui, 1996, p.9

Figure 3.5 Teacher evaluation and professional development

Based on the structure above, Cheng suggested three different strategies for improving teacher effectiveness, the short-term, long-term and dynamic strategies.

The short-term strategy is the traditional, most commonly used strategy for improving teacher effectiveness. It focuses on changing overt teacher performance (mainly in terms of teaching behaviours) to adapt to the teaching context. Short-term training is used to correct teacher weaknesses and undesirable behaviours. However, the strategy is based on three assumptions. Firstly, it assumes that teaching context is something "given" and not alterable, and that in order to achieve high quality student learning outcomes teachers must accommodate or adjust their behaviour to the internal teaching context. Secondly, it assumes that teacher behaviour in classrooms must be altered or changed if unsatisfactory student learning experiences and outcomes are identified. Thirdly, it assumes that some straightforward prescriptions such as standard teaching behaviours and methods can readily be used by all teachers. Curriculum planners and teacher trainers often develop and introduce a greater number of standard teaching behaviours to school teachers (in Cheng and Tsui, 1996).

Using a short-term strategy, the teacher becomes an implementer, but the role of teacher is passive and is externally managed**.** Because this view ignores the importance of teacher competence for teacher performance in the classroom, it may not successfully induce any long-term and systematic improvement in teacher effectiveness. Without development in teacher competence, persistent and effective change in teaching behaviour is almost impossible (in Cheng and Tsui, 1996).

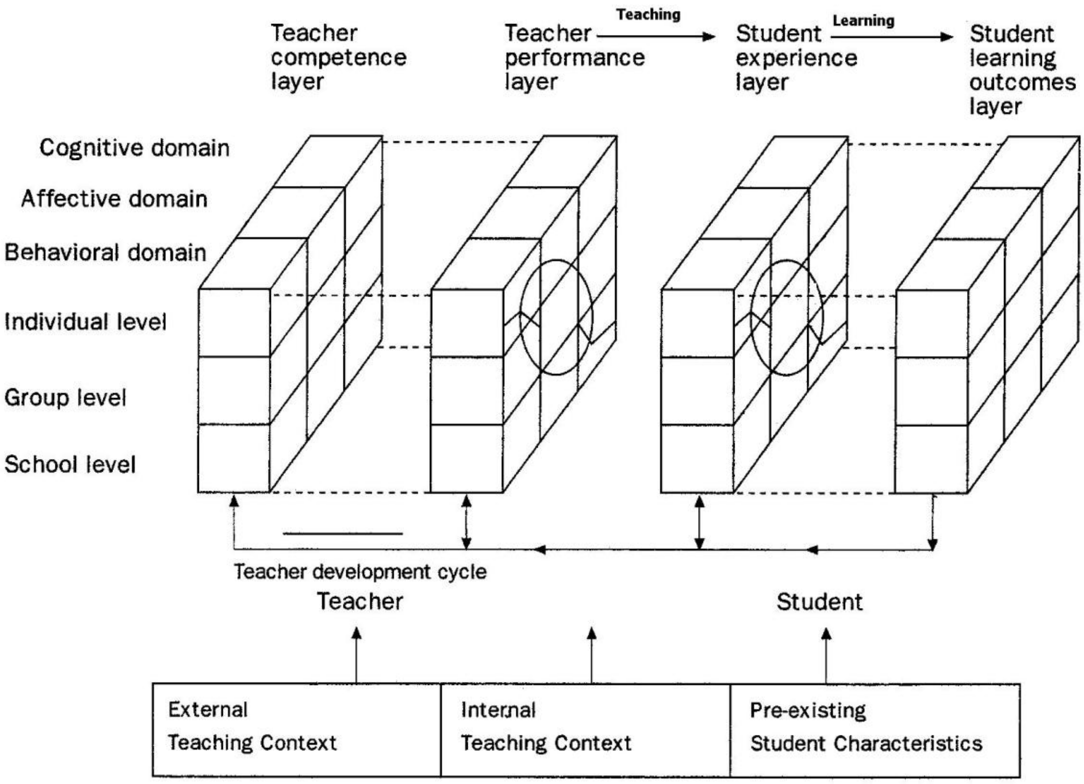
The long-term strategy focuses on strengthening teacher competence so that teachers can have sufficient professional knowledge, techniques and confidence to develop their own teaching styles, to adapt to the external and internal teaching contexts, and to perform effectively in the classroom. Strengthening teacher competence is a continuous, long-term process involving systematic learning and reflection. Through summative, formative and diagnostic teacher evaluation, teachers may learn continuously and develop repertoires of professional competence which can be used to adapt to different teaching contexts and carry out teaching tasks effectively. Through systematic professional development teachers can grow and develop to acquire new knowledge, skills and attitudes which in turn promote or improve their teaching performance at different stages of their careers (in Cheng and Tsui, 1996).

Cheng (in Cheng and Tsui, 1996) suggests that this long-term strategy is far better than the short-term strategy because it may have long-term systematic and internalised effects on teacher competence and performance. However, this strategy still has limitations because it assumes that the external and internal contexts of teaching are “givens” and are static. The implication is that the role of the teacher is passive and partially managed, and does not expect teachers to take an active role in changing the external and internal teaching context in order to create an improved environment for teaching and learning. As teacher effectiveness may in certain cases not be maximized, the dynamic strategy was proposed.

The dynamic strategy assumes that most of the components associated with the structure of teacher effectiveness can be altered. In order to maximize teacher effectiveness, both the teacher’s competence and performance and the teaching contexts should be changed. Teachers should not only adapt to the teaching contexts, but also adopt the role of change agents. This strategy aims at empowering teachers as educational leaders and professional implementers so that they can play an active role in improving both the external and internal teaching contexts and maximise their effectiveness at both organizational level and classroom level (in Cheng and Tsui, 1996).

Cheng (in Cheng and Tsui, 1996) argues that the activities of professional development and teacher evaluation should be further developed and strengthened to help teachers not only to gain knowledge and develop skills and attitudes but also to develop critical minds, entailing the ability to engage in self-reflection and management of their practice. Following this line of thinking, the concept of teacher effectiveness should therefore not be confined just to teacher behaviour or performance in the classroom, but should be extended to incorporate organizational aspects such as the teacher's involvement in educational reforms. Improving teacher effectiveness should be a long-term and dynamic process involving not only the teachers' professional growth but also the schools' continuous change and development. The effects of this strategy on teachers and schools are long-term and systematic, and can be internalised and institutionalised.

Cheng (in Cheng and Tsui, 1996) prefers the dynamic strategy, but all of the strategies have limitations because they ignore the complexity of teacher effectiveness and narrow the concept to the individual teacher, particularly in a classroom context. Taking into consideration the limitations of the traditional concepts, Cheng and Tsui (1996) developed a new conceptual framework introducing a third dimension of "total teacher effectiveness" whereby the "total quality" of the teacher competence layer contributes to the "total quality" of the teacher performance layer and the latter contributes to the "total quality" of the student learning experience layer and then to the quality of the student learning outcomes layer.



Source: Cheng and Tsui, 1998, p.41

Figure 3.6 Levels of teacher effectiveness

As seen in Figure 3.6, Cheng and Tsui's (1998) model consists of the following layers:

Student learning outcomes, which are the product of the interaction between students' learning experience and individual characteristics.

Student learning experience, which is affected by both teacher performance and the internal teaching context.

Teacher performance, which is determined by the interaction between teacher competence and the external teaching context.

Teacher training and pre-existing teacher characteristics, which can contribute to teacher competence.

Teacher evaluation, which is composed of activities based on information from teacher performance and student learning experience outcomes, and can facilitate the development of teacher competence.

Professional development activities, which are supported by the characteristics of the external and internal teaching contexts, teacher performance, students' individual characteristics, their learning experience and learning outcomes and thus can contribute to the development of teacher competence and teacher education (Cheng and Tsui, 1996, p.8).

The conceptual framework defined by Cheng and Tsui (1998) comprises three dimensions comprising the three domains: cognitive, affective and behavioural - three levels: individual, group and school - four layers: teacher competence, teacher performance, student experience and performance and other related components of teacher effectiveness, such as the external teaching context and the internal teaching context. The model also illustrates the relationship between all of these elements. However, teacher education and teacher characteristics, which are very important components of teacher effectiveness, which are omitted from Cheng and Tsui's (1998) model, should be explicit in the conceptual framework model. These two components were part of the previous model adopted by Cheng and Tsui and there is no explanation why they were excluded from the 1998 model. The teacher development cycle included by Cheng and Tsui (1998) cannot be completed without taking into consideration the teacher's characteristics and teacher training. In the conceptual framework of total effectiveness, the relationship between these components is not clear. The two complement each other, since Figure 3.5 establishes a clear relationship with all components and Figure 3.6 establishes the levels and layers.

The discussion of the many models presented in this section has assisted in developing a framework which could be considered for understanding the importance of teacher training in developing teacher competence for successful teaching and learning in schools, and thus improving the performance of students. In the Mozambican context, it is crucial to see these three aspects as inter-related, as the one impacts on the other. Effective teacher training is vital in enhancing successful teaching and learning in schools.

3.5 ASSESSMENT OF TEACHER COMPETENCE

"The teacher is the key player on the educational stage and we often expect him or her to make up for the deficiencies in the curriculum and in educational resources. The success of the educational enterprise is therefore believed to hinge on the quality of teaching that goes on in the classrooms" (Howie and Plomp, 2005, p.53). This claim means that from a professional point of view the competence of a teacher is important, as successful teaching and learning depends on it. But evaluating or assessing a teacher's competence (performance and effectiveness) is a difficult process as this evaluation is dependent on student performance and, as in any evaluation, it is very difficult to distinguish between different levels of competence and skills.

Medley and Shannon (1994) observed that a test to measure teacher competence should include not only content knowledge of the subject matter the teacher is expected to teach, but also general knowledge of the kind that any educated adult is expected to possess. The term "teacher effectiveness" will be used to refer to the results a teacher obtains or the extent of progress the pupils make toward some specified goals of education. One implication of this definition is that teacher effectiveness must be defined, and can be assessed only in terms of the behaviours of pupils, not the behaviours of teachers. For this reason, and because the extent to which pupils learn is strongly affected by factors not under the teacher's control, teacher effectiveness will be regarded not as a stable characteristic of teachers as individuals but as a product of the interaction between certain teacher characteristics and other factors that vary according to the situation in which the teacher works.

According to Popham (1997), the teacher and the school are evaluated according to the learning and achievement "outputs" of their students. In addition, the measurement of teacher competence in terms of pupils' performance is often difficult because many variables are involved. Simply put, most efforts to connect student achievement to individual teacher performance have floundered in the past on the basis of the following weaknesses:

- ❖ The measurement does not take into account teaching context as a performance variable;
- ❖ The measurement is unreliable, in part because it does not include time as a variable – both the teacher's time with a cohort of students and some model or models of sufficient time to see learning effectiveness in students;
- ❖ The measurements used to reflect student achievement are not congruent with best practice and the philosophy of instruction in modern education (Stufflebeam, 2003, p.610).

As Medley and Shannon (in Dunkin, 1997) pointed out, the main tools used in assessing teacher competence are paper-and-pencil tests of knowledge. Indeed, the main tools for assessing teacher performance are observational schedules and rating scales and the main tools for assessing teacher effectiveness are data collection about the teacher's influence on the progress that the student makes towards defined educational goals; and these data are most likely to be student achievement tests.

Consequently, a teacher's performance and the students' achievement are inextricably linked. This linkage is a compelling argument for ensuring that how students perform on some array of assessments becomes an important part of a teacher's performance evaluation (Stufflebeam, 2003). However, a critical part of the evidence for the link between student tests and teacher performance needs to be the teachers' knowledge and awareness of the testing methodologies and test content, and the interface between those methodologies and the content and curriculum that guides their instructional practices (Stufflebeam, 2003).

In the past decade, considerable progress has been made towards developing a framework for teaching and learning in three main areas: what student testing can and should do as a part of the instructional system; what teachers should know and be able to do and how to incorporate those values and standards into the preparation programme for training teacher; and the links between teacher performance and student achievement. In addition, innovative evaluation strategies for both beginning and in-service teachers have been implemented in several states in the United States. Many of those evaluation strategies combine the assessment of teacher performance with the development and enhancement of teaching skill (Stufflebeam, 2003).

Student testing is an increasingly important part of any consideration of teacher evaluation practices, given the current political and policy climate. How teachers are prepared for their professional work and how they should be prepared to do that work well is the foundation for any evaluation system for professional performance. Clearly, with the emphasis on links between teacher performance and student achievement, the preparation of teachers for their instructional and motivational roles is essential. And the growing body of evidence about the links between teacher performance and student achievement must be an influential element in the evaluation of teachers' work and the provision of support for their ongoing learning to improve that work (Stufflebeam, 2003).

Exactly how to attribute any student's achievement in any particular year to the current teacher, how to control for variables far outside a teacher's control but profoundly important in affecting students' achievement, and how to create and use really sound and valid assessment instruments are some of the challenges in gathering the evidence to support the argument. And these challenges have proved sufficiently daunting, as the links between teachers' work in the classroom and students' scores on assessment have never really been shown to be systematic in the U.S.A. (Pearlman and Tannenbaun, 2000), which means that in the Mozambican context teacher evaluation is even more challenging. If one evaluates a teacher based on the pupils' outcomes then the lack of infrastructure, the lack of school resources and the poor conditions that prevail in Mozambican schools have to be taken into consideration, as well as the internal (e.g. books, time in the class, class resources) and external teaching contexts (e.g. the school building, the library, the school's equipment) as these have a huge impact on teaching and learning.

The assessment of competences must include the issue of transfer, but assessment is a highly complex process. For instance, competence as a cognitive 'ability' may be determined by the observation of successful performance, but the successful performance may easily be the result of chance, and cognitive malfunctioning could thus be obscured.

To some extent, this assessment also seems to hold for cognitive skills. However, when assessing cognitive skills the focus on outcomes is supplemented with a focus on cognitive procedures or processes that refer to the conditions for success which seems to be impossible to achieve because the concept of 'competence' has a poor theoretical basis. Therefore, using Aristotelian logic (the *modus tollens*, i.e. denying the consequent), it is likely that incompetence can be determined, but not competence (Pearlman and Tannenbaun, 2000).

Barnett (1994) stressed that the capacity to cope with profound societal, international and ecological change cannot be covered by any concept of standardized competence. In this view, no competences can be identified that will carry us forward in a changing world because no competences will carry the value tomorrow that they have today. Competence may be stable but become worthless in a changing world.

Performance in new situations may even become “less competent” because of retention problems, the problematic transfer of acquired competences, or even because of gratuitous but inappropriate transfer. Clearly, the assessment of competences requires the perspective of time, and in this regard, we need to note again the lack of valid assessment standards appropriate to complex situations. As a result, when assessing teacher competence or performance it is vital to take into consideration some important variables such as the quality of parental support, the nature of the relationship with the community, what teachers expect of their pupils, and the quality of the school leadership.

Parental support in education is vital, as compelling evidence has shown that family involvement has a positive effect on learners’ academic achievement. The family plays a major role as a socializing agent by supporting the individuals as they grow from childhood to adulthood. This role cannot be adequately replaced by any other institution. However, parents need to be informed about various and more effective ways of creating or developing learning opportunities and stimulating experiences for their children through their involvement in parenting programmes (Wyk, 2001). Community involvement in school activities has a positive effect on pupil performance. Fullan (2001) stresses that parents and the wider community have largely untapped expertise essential to the partnership. However well or badly parents do, they are the first educators. As part of community, schools need to develop an ‘invitational’ attitude towards parents and to do more to help parents assist their children. Dustmann, Rajah and Soest (1998) support Fullan’s position about the impact parents and the community have on pupils’ performance.

While far from being the sole goal of education, learning achievement is one of the most important outcomes of education, both for individuals and for society. But students are motivated to achieve not only though self-motivation but also through the involvement of their peers, their parents, their teachers, and their communities. This complexity of participation presents a strong challenge to researchers attempting to assess and improve on motivational techniques that would maximize the learning opportunities for pupils (Fuhrman, 1991). Incentives for students to achieve include not just direct incentives for the pupils but also incentives affecting all those who influence the pupils’ learning performance (Windham, 1997).

Teacher expectation is another important variable, as research has shown that because teachers have not expected very much from them, many students have not learnt very much. It is therefore important to motivate and encourage youngsters and require them to master a body of knowledge and skills that they will need if they are going succeed in the new world order. If standards are not raised, reform will have no purpose, particularly as students will move out into a world of determined, well-educated competitors (Murphy, 1993, p.642).

Leadership is a further variable, as the literature on school improvement emphasizes a variety of ways in which principals may affect school improvement. Some authors have identified the links between leaders and academic achievement. The outcomes-based evaluation of principals has assumed both a direct (explicit) and indirect (implicit) linkage between principals and the levels of student achievement (Glasman and Heck, 2003).

Finally, despite the importance of all the variables mentioned, the factor that contributes most significantly to effective teaching and learning is the quality of teacher training, with special emphasis on the training and its management, particularly in developing countries where a range of teacher training models have been implemented over the years.

3.6 THE RELATIONSHIP BETWEEN TEACHER COMPETENCE AND PUPIL PERFORMANCE

The problem of teacher competence is not related only to the level of teacher instruction but also to the level and quality of training. Both the academic level achieved and the quality of the professional training received, contribute to the competence of a teacher. Researchers such as Kanu (1996), Châu (1996), Myint (1999) and Darling-Hammond (1999) refer to teacher competence when they stress that the quality of education depends on the quality of the teacher. Researching teacher competence can be done from a variety of perspectives. According to Warham (1993), the positivist view of the scientific teacher suggests that only research generated from academic sources is relevant to assessing teacher competence. The hermeneutic view suggests that only knowledge generated within the classroom is relevant to assessing teacher competence. However, Warham (1993) points out that the middle view of the critically reflective teacher attempts to overcome these difficulties by accepting that knowledge generated from both inside and outside the classroom is important for assessing teacher competence.

Châu (1996) maintains that the teacher’s level of competence is one of the factors that directly affect the quality of teaching. One might think a priori that there should not be major problems in this regard at the primary level, given that most teachers in the countries studied have a reasonable level of education (10 to 12 years of school). But the formal level of education is not necessarily synonymous with competence. Classroom observations in the different countries show that certain teachers have an insufficient mastery of the subject matter they teach. In addition, many of them lack the pedagogical know-how required for good presentation of the material (Shulman, 1986). Insufficient mastery of subject matter was particularly true in Madhya Pradesh, India, where the findings revealed that most teachers had not received any specific professional training, which had an effect on the teaching and learning and thus on pupil performance. And similar problems have also been identified in other countries (Châu, 1996, p.186).

Researchers such as Steyn (1999) and Dimmock (1990) confirm the important role of teacher competence in ensuring the quality of pupil performances when they say: “Seventh grade pupils tended to perform better on high level thinking tasks when the teachers teaching them had advanced certification in mathematics” (Howie, 2002, p.49). According to Botha and Hite (2000), a competent teacher will focus on certain predetermined results or outcomes which are to be achieved by the end of each learning process. Therefore, the use of student achievement as a gauge of teaching effectiveness is reasonable and appropriate and one could say that students’ learning is the most important criterion by which to evaluate teachers.

Links between student achievement and teacher effectiveness, and the measurement or assessment methodologies used to track such links, are increasingly considered as “connected accountability” in order to assess performance in teacher evaluation systems (Pearlman and Tannenbaun, 2003, p.617). In addition, there is much more insistence on the necessary connection between teacher performance evaluation and students’ achievement, but no more clarity about how such a connection can be credibly and validly made (Ibid, 2003).

Improving teaching practice by improving teachers’ knowledge is essential if the quality of education and most particularly primary education in the developing world is to improve. This assertion is not intended to diminish the importance of investments aimed at improving facilities, developing coherent curricula, providing cost-effective instructional materials, textbooks, or technology, or improving school management. But the impact of each of these investments on student learning depends upon the capacity of teachers to utilize resources effectively in classrooms (Raudenbush et al., 1993).

From the review of the literature, one can conclude that the concept of competence is complex and that there are many factors which contribute to teacher competence. However, two important aspects, which should be considered in developing teacher competence in teacher training programmes, have not been addressed. There seems to be a lack of literature which looks at the competence of the trainers in the teacher training institutions and secondly, there is lack of literature about the importance of the availability and quality of the staff of annexe schools used for practicum or supervised practice, which is regarded as a vital aspect of teacher training (Ben-Peretz, 1994).

In the next section, the relationship between teacher competence and pupil performance will be highlighted with an examination of cross-national studies conducted by a number of organisations on the topic of the performance of pupils in reading and mathematics.

3.7 PUPIL PERFORMANCE IN READING AND MATHEMATICS IN CROSS-NATIONAL STUDIES

Primary education is recognized as a basic human right, vital to the development of individuals and societies. One of the goals of primary education is to help children to acquire and develop reading skills as “It is the foundation for learning across all subjects (Mullis, Kennedy, Martin and Sainsbury, 2004). The development of reading skills is a constructive and interactive process. However, if this is not accomplished, the lack of and/or poor reading skills can have an effect on pupil performance.

3.7.1 The Acquisition of Reading Skills

The acquisition of reading skills is the goal for primary education and thus it is the foundation for all further learning. Reading also plays an important role in making a success of education and in the citizens’ lives. However, in the SACMEQ countries the study of pupils’ performance has revealed problems which are thought to be related to literacy, and so it becomes important to discuss factors related to the acquisition and development of reading skills.

In the process of reflecting on the acquisition of reading skills it is imperative consider two important matters: firstly, the acquisition of the prerequisites making it possible for pupils to learn to read, and secondly, the quality of the teachers and the level of their knowledge of the methodology of teaching reading skills.

There are three abilities, which are prerequisite to the acquisition of reading skills, namely the speaking, reading and writing abilities:

Speaking abilities include knowledge of the body, the development of orientation in space and time, the development of auditory perception; the development of the attention span and auditory memory, the development of visual perception; the development of the other senses; vocabulary enrichment and the development of the ability to generate sentences.

Reading abilities include the development of special visual abilities, the development of special orientation to graphic symbols, lateral dominance, the development of auditory discrimination and memory, the development of comprehension abilities, and mastery of the concept of maintenance.

Writing abilities refer to the development of visual-motor coordination, the development of fine and discriminatory motor coordination, and the development of kinaesthetic memory (Passos, 1995, adapted from pp.19-24).

The study carried out by Passos (1995) in first grade pointed out that a pupil who had attended preschool or kindergarten would perform better in the acquisition of reading skills than one who had not. For instance, in Mozambique a study carried out in the first grade to evaluate the level of acquisition of prerequisites during the school years showed that "among the four variables (age, sex, mother tongue and attendance of kindergarten) attendance of kindergarten is the one which registers the most significant differences in every test (ABC and Reversal)" (Passos, 1995, p.78).

The study carried out by the World Bank (2006) found that the average reading achievement was weakest among students who had not attended preschool. Internationally, the average achievement was also the lowest among students that had not attended preschool (491 points), and the highest average achievement for those who had attended preschool for more than two years was 523 points. Poor reading skills in early grades (slow speed and poor fluency) are hypothesized to be behind much of the poor performance that appears in achievement tests later on, as well being linked with early dropout and repetition, particularly among the poor (Abadzi, 2005, in the World Bank, 2006, p.35).

The results of the two studies, Passos (1995) and (2006), stress the importance of the acquisition of the prerequisites for reading and writing and the role that they play in the effective learning to read. For instance, it is not possible for pupils to distinguish the difference between the symbols of the alphabet or the difference between their sounds if they are not able to recognise the difference or similarity between objects or to recognise the different sounds created from different objects, just to mention some examples. The acquisition and teaching of reading skills is a very difficult task for pupils and teachers, but the inability of children to attend preschool makes it very hard for a teacher to teach and for pupils to learn reading skills.

3.7.2 Methods of Teaching Reading Skills

Besides the importance of the prerequisites and the role that they play in the acquisition of reading skills, it is crucial to take into consideration the methods used to teach reading. The following are important to recognise in this regard: the level of knowledge (the dominion) that the teacher possess about the methods and the implementation of the methods in the textbook. The methodology should take into consideration whether the language of instruction is the first or second language for the majority of the pupils, and then define the strategies appropriate to teaching reading skills. It necessary to ensure that the methodology used in the textbook is appropriate for application in the classroom. All of these aspects play an important role in facilitating the acquisition of reading skills. It is essential to stress that when pupils do not speak the language of instruction, the method selected should be appropriate to second language instruction, which means that the pupils should first acquire the language and then learn to read it. When pupils already speak the language of instruction, this ability forms a foundation upon which to develop further oral, reading and writing skills.

The speed with which pupils read in the first grade is directly related to the method used as a starting point to acquire reading skills. For example, one method is introducing the pupils to phonics and the alphabet. With this method, pupils have a tendency to spell out the words and not read full sentences. The other methodology is introducing the pupils to words or sentences, and in this case, the tendency of pupils is to read the sentence with fluency and comprehension, which means that they tend to read at a better pace and acquire and develop reading skills faster than those whose starting point is phonics or the alphabet. Research has shown that there are advantages and disadvantages to both methods. It is therefore important to take into consideration the most appropriate methods for the context.

In Mozambique, the method of teaching reading skills is defined by the Ministry of Education and Culture and it is compulsory for classroom practice. Teachers cannot choose the method that they want to use, and the textbooks prescribe the ways in which teachers must apply the method. The extent of the success of the teaching of reading skills therefore depends on how deep the teachers´ mastery of the method is and how they implement it in their classrooms.

Sometimes in-service training is indicated as a way in which to provide training which might impact on the achievement of results. In Peru, “the school buildings were upgraded, there was an improvement in the support materials distributed, and substantial in-service training was provided. Nevertheless, the school system showed no signs of improved teaching and learning. It was alleged that this lack of improved teaching and learning was as a result of a lack of incentives to motivate teachers, falling teacher salaries (low morale), and almost no supervision or teacher accountability” (World Bank, 2006, p.36). Perhaps it could have been differently concluded that there was little understanding of content knowledge and of the methodology needed to teach the various subjects?

Often teachers are trained to use active methodology, but lower primary teachers need to be given specific methods to teach reading and other subjects. A possible reason for the failure of in-service training is because the modules or the programmes of training are not based on a diagnosis identifying particular needs to be addressed by the training, with a focus on specific methods and practice lessons in primary schools. Demonstration lessons in schools show how theory is to be implemented. They lead to better comprehension by the teachers and therefore to a change in their attitudes to their task.

In 2000, the evaluation of Ligacao Escola Comunidade (LEC) (the community school link) project carried out from 1996 to 1999 in Nampula province in Mozambique, showed that the approach used in the project had been well received by the teachers (Alberto and Mahumane, 2000). The researchers had first conducted a diagnosis to identify the main problems teachers in the region were facing in their daily school life, and then focused on specific methods of dealing with them. The training started with theoretical lessons, which were followed by simulations, and finally by practice lessons in primary schools. This approach, according to the teachers, was helpful. For instance, 79% of the teachers said that the approach allowed them better assimilation of the content. Then, 83% of teachers they said the approach allowed them to learn new teaching strategies and to change their attitudes, 86% of the teachers said the in-service training improved their performance, 79% of the teachers said that the approach improved their pupils' performance, while 77% of the teachers said that the approach improved pupils' achievement (Alberto and Mahumane, 2000, p.16). For 62% of teachers, the practice lessons played an important role in their learning of the methodology and in their qualitative change in terms of performance (Alberto and Mahumane, 2000, and World Bank, 2006). Now, in order to change the attitudes in classrooms and to change the methods used, it is vital to show both in theory and in practice how to teach using the new approach.

3.7.3 Pupil Performance in Reading in Cross-national Studies

In this section, the results of some studies of pupils' performance in reading and mathematics are presented and discussed. According to Chowdhury (1995), reading is a basic skill and plays an important role in citizens' daily lives as well in a country's development. Literacy rates represent the most telling indicator of a country's educational status. Studies show that literacy increases the productivity and earning potential of a population, and improves its quality of life.

Reading skills are also the foundation on which all learning of other subjects is established. The development of reading skills depends on the internal and external efficiency of the school system. Over the years, many cross-national studies were conducted (elaborated on in Chapter 4). One of them was the Reading Literacy Studies in 1991 (IEA), which involved some countries in Africa, America, Asia and Europe. The IEA carried out a study that involved two age groups, that is 9 and 14 year-old learners. A Rasch scaling method was used to create an international scale which had a mean of 500 and a standard deviation of 100 (Elley, 1992, p.11). The results from different countries showed that generally speaking, there are some problems relating to reading competence, especially in some developing countries. In terms of pupils' performance, it was observed that the difference between most developed countries was not very great, but there were real, stable differences in reading literacy levels between nations. All the developing countries tended to have lower achievement levels than the industrialized nations. In general, their economic position was weaker and they lacked long-standing literacy traditions (Elley, 1992).

In terms of the overall mean, Finland was one of the countries where pupils achieved the highest performance in the two age groups of 9 years old (569, SE 70) and 14 years old (560, SE 65). Pupils in Venezuela had the lowest mean (383, SE 74) for 9 year olds, while pupils in Botswana achieved the lowest mean among pupils of 14 years with 330 (SE 43) (Elley, 1992, pp.14-24). The result of the IEA study showed that Finnish and Swedish students live in rich, well-educated, relatively homogeneous societies with abundant resources and high standards of health. The last three countries (Nigeria, Zimbabwe and Botswana) on the list, however, shared virtually none of these apparently beneficial economic and social conditions. To some extent, literacy levels reflect the economic and cultural advantages of the country as a whole which is illustrated by the fact that Sweden had the highest reading literacy achievement (561) of all of the countries participating in the IEA's Progress in International Reading Literacy Study (PIRLS) 2001, while Belize had the lowest one with (327) (Mullis, Martin, Gonzalez and Kennedy, 2003).

Regardless of their level of development, some countries such as New Zealand and Singapore performed better in IEA than others. New Zealand students achieved high scores in all domains, which were an average of 28 points above the predictions based on their relatively modest socio-economic circumstances. New Zealand reading facilitation methods have subsequently enjoyed a notable international reputation (Elley, 1992, p.16). Despite the fact that the majority of pupils do not speak the school language at home, Singapore achieved well above the international mean of 515 (SE 72) at the age of 9 years and 534 (SE 66) at the age of 14 years. According to Elley (1992), the Singapore case is a challenge to current thinking that says children should learn to read in their mother tongue. Over 70% of the students have, as mother tongue, a language that is different from that of instruction, yet the students scored 521 and 519 in the Narrative and Expository domains respectively. According to Elley (1992), countries that use a language of instruction, that is different from the one that students normally speak at home, could learn from Singapore (Elley, 1992).

The examples of Singapore and Mozambique (see the study described earlier) demonstrate that the issue of whether the acquisition of reading skills takes place in the pupils' first or second language is not the most determining variable. Singaporean pupils performed better (above the international mean) than pupils in some developed countries (such as Germany - 503; 522 and Canada - 500; 522, in 9 year old and 14 year old pupils respectively) where the majority of pupils speak the language of instruction at home and the schools have better resources.

A close analysis of the Singapore experience of the process of teaching the acquisition of reading skills, namely the awareness of the prerequisites, the selection of the method of teaching, and the training of the teachers, may be of value to developing countries. Some SACMEQ countries face serious problems in the teaching of reading as evidenced in pupils performing at Level 3 or below (see Chapter 8, Figure 8.9), and it is thus necessary to discover the reason for pupils' low performance in these countries. As suggested by Elley (1992, p.35) "there are clearly some educational factors which are exerting influence on achievement beyond the economic and cultural indicators." Only when these issues are addressed will pupils' performance improve.

3.7.4 Gender Differences in Reading Performance

Previous international studies of reading have shown that girls tend to surpass boys in most countries and cultures, both in their reading interest (Guthrie and Greaney, 1991 in Elley, 1992) and in their achievement levels in reading (Thorndike, 1973, Downing, 1972 in Elley, 1992).

It was identified in the 2000 PISA study that in "all countries there are small gaps between the performance of boys and girls in reading, in favour of girls. This gap is generally smaller in countries with the highest overall scores. Overall, the Scandinavian countries of Sweden, Finland and Denmark show less segregation on all indicators, while Germany, Greece and Belgium show the most. The UK has below average segregation in terms of all indicators except sex, despite a commonly held but unfounded view that segregation in the UK is among the worst in the world" (Gorard and Smit, 2004, p.15).

Analysis of the results for all countries participating in the PIRLS 2001 also showed that girls had significantly higher achievement than boys, as evidenced by the following:

> *On average, across countries, significantly more girls than boys reached each quartile of their country's achievement distribution. More specifically, 29 percent of girls compared with 21 percent of boys reached the upper quartile, 55 percent compared*

> *with 45 percent reached the median level, and 79 percent compared with 71 percent reached the lower quartile. By subtraction, it can be determined that fewer boys (8 percent, on average) than girls reach the lowest quartile of achievement, and that 29 percent of boys are below the lowest quartile compared to 21 percent of girls. Statistically significant gender differences favouring girls at each quartile were consistent across countries, with only a few exceptions* (Mullis et al., 2003, p.29).

In the IEA study of reading literacy, 9-year-old girls were found to be further ahead of boys (Elley, 1992). Girls read more often that boys, read for enjoyment, and preferred reading about a wider range of topics than the boys. The SACMEQ study (2000) followed the same pattern. In the SACMEQ II study, the girls outperformed the boys in reading. For instance, in terms of the mean, girls scored 505 while boys scored 495, which was below the international mean of 500.

In seven countries, a strong relationship was revealed between the number of books reported in the students' homes and the total amount of learners' voluntary reading across books, magazines, and newspapers (Elley, 1992). According to Elley (1992) the pattern was that the students who read least in their individual spare time had the lowest average scores (Elley, 1992). A number of studies have demonstrated that students who read often tend to read well, which shows that there is a positive correlation between the volume of reading and achievement levels.

A correlation between the volume of reading and achievement levels is evident in the above information. In fact, when pupils read they submit themselves to an exercise of reading and interpretation of what they are reading, and in this way they improve their level of text comprehension and increase the range of their vocabulary and the extent of their general knowledge.

3.7.5 Prerequisites for Acquisition of Mathematical Skills

As with learning to read, there are prerequisites for learning the basics of mathematics, such as the notions of size, quantity, position, distance, direction and course, weight, order and shape. Before pupils start doing mathematical operations they must understand what they are doing and why. The purposes of introducing mathematics in primary education are to help children to develop the ability to think logically, and to provide the foundation for the study of more advanced mathematics in the later grades. The way to achieve this foundation is via the step-by-step construction of mathematical content, by engaging the pupils in a developmentally progressive manner. For example, it is not possible for a pupil to develop the capacity for abstract thought if the pupil cannot already solve concrete problems, or perform division operations if he or she cannot add. Maybe the difficulties that pupils face in upper primary education are related to inadequate teaching or retention of more basic skills in the first grade. This bad start tends to result in an accumulation of difficulties as the pupil goes from grade to grade.

3.7.5.1 Pupil performance in mathematics in cross-national studies

As with Portuguese, mathematics is a core subject in Mozambique. This status means that pupils cannot pass to the next class if they have marks below 10 (50%). It is therefore vital for teachers to facilitate pupils' acquisition and development of mathematics skills. Cross-national studies, conducted over the years, have revealed high performing and low performing countries as well as the difference in scores between each of these which are sometimes significantly large.

In 1995, the IEA carried out studies in mathematics and science in some countries in Asia, Europe, America, Australia and Africa. The Trends in Mathematics and Science Study (TIMSS) (1995) revealed that pupil performance is high in some Asian countries. For example, Singapore (601) was the top-performing country at seventh grade, followed by Korea (577), Japan (571), and Hong Kong (564). These countries all performed very well, as did Belgium (558) and the Czech Republic (523).

Beaton et al., (1996) explains that "comparisons also can be made across the means and percentiles. For example, average performance in Singapore was comparable to or even exceeded performance at the 95th percentile in the lower-performing countries" (p.24). Lower-performing countries included Greece (440), Colombia (369), and South Africa (348).

In examining all countries participating in TIMSS, the same author stated that there were very large performance differences between the top performing and the bottom performing countries and "differences between the extremes in performance were very [also] large within most countries" (Beaton et al., 1996, p.24).

Another IEA study (1997) showed that Korea (561) was the top-performing country at the lower grades (often the third grade) followed by Singapore (552), Japan (538), and Hong Kong (524). The rest of the countries performed below the international mean (500) and the lowest-performing countries included Portugal (425), Norway (421), Iceland (410), and the Islamic Republic of Iran (378) (Mullis et al., 1997). The difference between the scores of the top-performing Korea (561) and the bottom-performing Islamic Republic (378) was very large.

In the upper grades (often the fourth grade), Singapore (625) was the top-performing country, followed by Korea (611), Japan (597), Hong Kong (587), the Netherlands (577) and Austria (559), and all of these countries performed well above the international mean of 500. Some countries performed below the international mean (500). The lowest-performing countries included Portugal (475), Iceland (474), the Islamic Republic of Iran (429) and Kuwait (400) (Mullis et al., 1997). The difference between the scores of the top-performing Singapore (625) and the bottom-performing Kuwait (400) was again very large. The results show an increase in the mean from the lower to the upper grades.

In the TIMSS 2003 study, Singapore was again ranked first at both fourth and eighth grade on the test.

Some countries showed a significantly higher average achievement compared with their performances in 1995 and 1999, but again others experienced significant score declines. For instance, the Republic of Korea; Hong Kong, China; Latvia; Lithuania; and the United States were among those that improved at Grade 8. Greaney and Kellaghan (2008) explain that in this study "roughly one-third of the students in the highest-performing systems scored at the advanced benchmark level. In sharp contrast, 19 of the lowest-scoring systems recorded 1 percent or fewer students at this benchmark level" (p.109).

The 2003 PISA survey of mathematical literacy was conducted amongst 15 year olds. Donaldson (2005) in the inspection report highlights that Scotland scored significantly above the Organisation for Economic Co-operation and Development (OECD) mean. Only one OECD country had a mean score in this area which was significantly higher than that of Scotland. Donaldson has reiterated that improving pupils' acquisition and development of mathematics skills should be a key priority in the school systems, as is being done in Scotland (2005). He states that most pupils at all stages in primary school were attaining well in number, money and measurement and their skills in written calculation were well developed. But it seems that if these skills are not practised in a sufficient variety of practical contexts, that development is not continued and weaknesses begin to show in the Secondary Schools (Donaldson, 2005, p.1).

The above information emerging from cross-national studies suggests that there is a need for the lower performing countries to examine the different factors which contribute to reading and mathematics achievement and for each education system to focus on the development of reading and mathematics education in the primary school years to ensure that pupil performance is improved.

3.7.5.2 Gender differences in mathematics in cross-national studies

Girls tend to surpass boys in reading. Mathematics tends to favour boys instead of girls. As pointed out by Beaton et al. (1996) in TIMSS, there was no significant difference in most countries between the average mathematics achievement of Grades seven and eight girls and boys, but the differences in achievement that do exist in some countries tended to favour boys rather than girls. Boys in Japan, Iran, and Korea achieved significantly higher means in mathematics than girls in both grades. The boys in Grade 7 performed better than the girls in Belgium, Switzerland and England (Beaton et al., 1996). In examining the contents of the mathematics tested, it can be observed that performance differed most in measurement, where boys had a higher level of achievement than did girls in a number of countries. Iran was the country where the most significant difference was found in Grade 7 (Beaton et al., 1996).

According to Mullis et al. (1997), in the TIMSS study, in most countries girls and boys had approximately the same average mathematics achievement at both grades. However, the few significant differences in achievement that did exist in some countries favoured boys rather than girls. Boys had significantly higher mathematics achievement than girls in both grades in Korea. Boys also outperformed girls in the fourth grade in Japan and the Netherlands. In the third grade, significant differences were found in Hong Kong, Canada, Iceland, Norway, and Slovenia (Mullis et al., 1997).

In the TIMSS 2003 study overall, gender differences in mathematics achievement were negligible. Girls, however, outperformed boys in some systems, while boys did better in other systems. A high level of parental education was associated with higher achievement scores in virtually all systems. At both fourth and eighth grades in the 2003 study, the number of books in the home correlated significantly with students' mathematics achievement (Greaney and Kellaghan, 2008).

The SACMEQ II study produced the same pattern. Boys obtained a mean of 502, which is higher than the girls' mean of 498.

3.7.6 Factors Influencing Pupil Achievement in Reading and in Mathematics

Factors such as school location, school facilities, teachers' education, qualification and experience, class size and pupils' background, just to give some examples, are identified in cross-national studies as factors to take into consideration as influencing pupil's performance in reading and mathematics.

3.7.7 School Factors

School-level factors have traditionally explained the low percentage of variance in many research projects primarily conducted in developed contexts (Howie, 2002, p.51). Reynolds and Cuttance (1992, as cited in Howie, 2002, p.51) reviewed a number of studies and found only 8% to 15% of variance attributable to school factors However, in some studies such as UNESCO (2008), the World Bank (2006), Howie (2002) and Chowdhury (1995), many factors related to pupils' performance were found at school level, especially in developing countries.

There are three major problems related to the location of a school: access, infrastructure, and the quality of schooling. The lack of physical access to a school is a major problem in primary education in developing countries. Children often do not go to school because places are not available or the schools are too far away from home (Chowdhury, 1995). School location was found to have a significant effect on pupil performance in mathematics in South Africa. Pupils achieved lower scores in rural schools than in urban schools (Howie, 2002). This finding was confirmed by Zhang (2006), when using the SACMEQ II data archive. UNESCO (2008) refers to the distinction between rural and urban schools as a basic reality in all countries – and a multi-dimensional education issue.

The quality of infrastructure and school resources is also related to pupil performance. The quality of the infrastructure in rural areas is usually poorer than in urban areas, as confirmed by Chowdhury (1995), and the school equipment is especially poor or sometimes totally lacking in rural areas. UNESCO (2008), too, refers to the important effect that the condition of a rural school and the availability and quality of school resources have on pupils' performance. The long distances to and from school and the poor school facilities contribute to weaker performance by the pupils and to the dropout and repetition rate. Some researchers such as Anderson (1991), Abagi and Odipo (1997) and Zhang (2006) confirm the negative effects of the lack of or poor school resources on pupil performance. The quality of the schooling is also an important determinant of participation and retention.

Poor quality teaching, curriculum, instructional materials and school infrastructure can have an adverse effect on student learning (Chowdhury, 1995, p.9). However, pupils living in urban areas tended to perform better than their counterparts living in rural areas. Usually schools in the cities had better buildings, equipment, and better qualified and experienced teachers than those in rural areas. These conditions are associated with the pupils' socio-economic status which is usually higher in towns or urban areas than in rural areas, and contributes to better pupil performance. As confirmed by Elley (1992), a pattern emerged in the study at the 9 year-old level. In a group of seven countries with predominantly lower national economic indicators, the low performance levels in rural schools became progressively higher as the size of the community increased. As a result, pupil performance is influenced by the context and socio-economic status. In contrast, students in cities were typically more proficient than children from small villages, by half a standard deviation (Elley, 1992). In order to attract teachers to depressed or rural areas, the World Bank has supported the construction of teachers' houses and has offered cash incentives for the recruitment of local people, especially females, as teachers in rural areas (World Bank, 2006) in an attempt to raise the standards in such areas.

In most countries, reading achievement is highest for students in urban schools, lower in suburban settings and even lower in rural schools (Mullis et al., 2003, p.224). According to Elley (1992), these gaps have been reduced in some countries by providing rural library facilities. For instance, the availability of books in places such as the school library or the classroom book corner and the number of books at home, as well as the possibility of borrowing books from the library, are variables that make a difference to pupil performance, as reported by Fuller (1987 in Elley, 1992, p.65): "Surveys of achievement in a number of countries have shown that the number of books available to students is a key factor influencing their level of reading ability." In addition, it has been found that the "book flood" (Elley, 1992) or supply of large numbers of high interest books in schools in six countries had consistently beneficial effects. Good readers require a plentiful supply of books (Elley, 1992). The number of books in the classroom, in a school library and at home, therefore, has a positive impact on pupil performance. Instructional material and technology are also relevant to the development of reading literacy, including the extent of the reading material available to pupils. Even where it is quite difficult for developing countries to provide basic materials for school such as textbooks, blackboards and desks, books are a variable which policymakers can influence. It would therefore be useful to further analyse the situation in the SACMEQ countries to find ways to provide books for pupils at schools.

The studies indicate that schools that have high achievement are better equipped than schools with low achievement. These schools usually have ample space, places for every student in the classroom to sit and write, textbooks for every student, and plenty of reading materials (both in classroom libraries and school libraries), small class sizes, and appropriately designed classrooms (Postlethwaite and Ross, 1992).

Mullis et al. (2004) also describe other factors at school level that directly or indirectly affect the acquisition of reading literacy, such as the school policy and curriculum, which establish the context for the formal reading instruction that children receive from the beginning of formal schooling. They point to the importance of the school environment and resources for developing reading literacy. The school environment encompasses many factors that affect pupils' learning. The sense of security that comes from having few behaviour problems and little or no crime promotes a stable learning environment. The school environment is also enhanced when staff members show positive attitudes towards pupils and collaborate in curricular and extracurricular activities that foster learning. School resources include resources as basic as trained teachers or adequate classrooms and space, as well as less essential but beneficial resources like comfortable furniture and surroundings.

Mullis et al. (2004) also consider other factors that "are likely to have a more direct impact on pupils' reading development than school environment. The instructional approaches and material used are clearly important to establishing teaching and learning patterns in the classroom, including the curriculum, the strategies employed to teach it, and the availability of books, technology, and other resources" (p.32).

The classroom environment and structure may have a significant influence on reading literacy development. The classroom can vary greatly, from a highly structured and teacher-centred space to a more open and student-centred space. The UNESCO (2008) study states that in some countries, pupil-centred approaches were positively associated with more experienced teachers and with pupils with more social advantage, but overall the teachers with more classroom resources practised more pupil-centred activities. In contrast, Mingat (in Verspoor, 2003) suggests that the results of studies (tests or national exams) are significantly affected by the characteristics of the classroom. It is what goes on in the classroom that counts more than the physical environment in which the educational services are provided.

The learning environment and the classroom culture can have a tremendous influence on pupils' attitude to mathematics and their achievement in the subject, as can external factors such as the arrangement of the furniture in the class, the availability of resources and the length of the mathematics period (Chapin and Eastman, 1996 in Howie, 2002).

There are instructional strategies and activities that teachers may use for reading (Creighton, 1997, Langer, 1995, Stiorer and Maybin, 1994; Mullis et al, 2004). The activities most relevant for reading literacy development include those that pertain to word recognition, comprehension, cognitive and metacognitive reading strategies, and writing activities such as constructing a story. Activities should be required of the pupils that integrate all of the language processes – reading, writing, speaking, and listening (Shanahan and Neuman, 1997 in Mullis et al., 2004). In mathematics, several classroom instructional methods were associated with pupil achievement. For instance, the more time that was spent doing problems from textbooks, the higher the achievement of pupils in Grades 4 and 8 (Arnold, 1998, as cited in Howie, 2002).

Homework and assessment are ways to extend instruction and assess student progress (Mullis et al., 2004, p.31), while in Howie's study (2002) homework is seen as a contribution towards pupils' learning, extending the curriculum beyond the classroom. The time spent daily on homework on language, science and mathematics was a significant predictor for 13 out of the 18 countries (Martin et al, 1996, as cited in Howie, 2002). Nevertheless, South Africa pupils that received more homework did not perform significantly better than those with less (Monyana, 1996, as cited in Howie, 2002).

3.7.8 Pupils' background and parental involvement

The background of the pupil is one of the variables that is referred to in many studies as being related to the pupil's performance. The knowledge, skills, aptitudes, attitudes and values the pupils leave school with are to a great extent influenced by the knowledge, skills, aptitudes, attitudes and values they had when they entered school. They are the result of an intricate and complex combination of their genetic composition and their home background (Anderson, 1991).

Pupils' socio-economic status (SES) has been shown to strongly impact on learning achievement (UNESCO, 2008). Recent research consistently shows a strong positive relationship between pupils' performance and SES, or indicators of SES such as the parents' or caregivers' occupation or level of education (Mullis et al., 2004). Howie (2002) and Kotte, Lietz and Lopez (2005), just to mention some studies, stress the relationship between pupils' SES and their performance. The number of books at home is the only variable that provided an additional measure of pupils' socio-economic level and was positively correlated with reading achievement in all countries.

The following variables were combined (use of test language at home, home possession, number of meals per week and number of books at home) and this composite measure was correlated with student reading literacy scores on the reading test at the student level. As expected, the correlations were positive for all countries which thus indicated that "students from homes with higher values on the home circumstances indicator tended to obtain higher achievement scores on the reading test than students from homes with lower values" (Postlethwaite and Ross, 1992, p.22).

Purves and Elley (1994, in Mullis et al., 2004) also stress that access to various types of printed material in the home is strongly associated with literacy development and achievement, and thus with pupils' performance.

Language in the home is also related to pupils' SES. Mullis et al., (2004, p.29) explain that "Learning to read is very much dependent on children's early experience with language. The language or languages at home, and how language is used, are important factors in reading literacy development. Children whose knowledge of the language used in formal reading instruction is substantially below that expected of children of that age are likely to be at an initial disadvantage. In addition, the use of different languages or dialects at home and at school may cause problems for young students learning to read."

Many studies show a positive correlation between the language of a test and the home language of the person taking the test. The stronger the background in the language of the test, the higher the achievement (Australia in TIMSS study, Papanastasiou, 2000). And in the PIRLS study Greaney and Kellaghan (2008) state that "students who spoke the language used in assessment at home tended to have higher scores than students who spoke other languages" (p.117). Howie (2002) found language to be a significant predictor of pupils' achievement in South Africa.

Parental and the community involvement also play an important role in the development of reading literacy. Parents and the community are resources with assets and expertise that are essential for the teachers. Apart from being the primary teachers of their children, parents are privy to special knowledge about their children. They have interest in and commitment to their children's success, and they can also contribute valuable knowledge and skills springing from their interests, hobbies, occupations, and place in the community (Gold and Miles, 1981). Thus, parents' attitudes towards schools have an influence on pupils' performance. There is consistent evidence that parents' encouragement, their activities, the interest they take in their children at home and their participation at school affect their children's achievement, even after the students' ability and the family's socio-economic status is taken into account. Students achieve personal and academic development if their families emphasize schooling, let their children know that they are concerned about their education, and do so continually over the years (Epstein, 1988 in Gold and Miles 1981).

Another important variable that makes a difference to a pupil's performance is the level of the parents' education, especially the education levels of the mother. This is an important determinant of pupils' enrolment as well as of pupils' performance, especially for girls, as confirmed by Chowdhury (1995). Parents who are educated, are more likely to understand the importance of schooling from their own personal experience and are more likely to send their children to school. Studies have found parental education, especially that of the mother, to be an important determinant of school enrolment, retention and achievement.

Mullis et al. (2004) emphasize that parents and other family members convey their beliefs and attitudes through the way in which they teach their children to read and to appreciate text. Christenson, Rounds and Gorney (1992) finds the connection between the home and the school to be important too. Across all of the home factors associated with acquiring reading literacy, parental or caregivers' involvement in children's schooling may be key to literacy development (Mullis et al., 2004). Research shows that pupils who discuss their studies and what they read with their parent or caregivers are higher achievers than those who do not (Mullis et al., 2003). "Parents' or caregivers' involvement can reinforce the value of learning to read, monitor children's completion of reading assignments for school, and encourage children through praise and support" (Mullis et al., 2004, p.30).

3.7.9 Teacher quality

The teacher is another very influential determinant of the classroom environment (Lundberg and Linnakyla, 1993). A teacher's qualities include preparation and training, the use of a particular instructional approach, and experience in teaching reading. This insight is shared by Mullis, Kennedy, Martin and Sainsbury (2004), who indicate that teacher quality is an important determinant of pupil performance.

Anderson (1991) explains that "like their students, teachers differ in terms of the knowledge, skills, aptitudes, attitudes, and values they bring to their classrooms. They also differ in their teaching experience" (Anderson, 1991, p.19). To reach the goals fixed by the Mozambican Ministry of Education, it is vital to equip teachers with the appropriate knowledge and skills that they need to teach. The quality of education hinges on the quality of teaching that goes on in the classroom reinforcing the idea that quality teachers make up for the deficiencies in the curriculum and in educational resources.

A good teacher can correct and adjust the curriculum and the syllabi to a specific context, and to their pupils' interests and motivation in order to achieve the goals defined by the Ministry of Education. Because it is not always possible to change the situations in which teachers work, the best way of inducing adaptation to a constantly changing context is to provide teachers with the appropriate knowledge and training to teach. One way of doing this is to equip them with the knowledge and skills that will increase their ability to provide improved opportunities to learn for all of their pupils. This training should increase the teacher's self-confidence and expertise in handling different classroom situations, thus responding to the different learning styles and rates of the pupils, and different class sizes and settings (Hargreaves and Fullan, 1992).

The above is well illustrated in Finland where a higher performance in mathematics is contributed to pre-service teacher training. Pre-service teacher education in Finland firstly, ensures that highly motivated students are recruited for their sought-after training programmes where the number of applicants for primary teacher education is 5-6 times the number of places available (Malaty, 2006).

Secondly, on completion of the programmes, these students move into the schools with a high-level teacher education qualification. Every schoolteacher must achieve a Masters degree: an M. Ed. for a primary school teacher (Grades 1 - 6) and an M.A. or M.Sc. for a secondary school teacher (Grades 7 - 12) (Malaty, 2006). One of the most popular studies in higher education is primary teacher education (Grades 1-6) where teachers as known as class because they must be able to teach all subjects to a class (Malaty, 2006). Thus, if teachers are well qualified and are equipped with appropriate knowledge and skills, their self-confidence and expertise in handling different classroom situations will be developed, leading to a more satisfactory teaching and learning experience where pupil performance is enhanced.

High-achieving schools have teachers with sound knowledge of their subject matter, sound pedagogical knowledge and skills, and good classroom management skills. These teachers usually demand a lot from students but are supportive of their students and get feedback systematically from the students on which types of objectives the students have attained, and give help to those who are having problems. They have a good knowledge of the education system's aims, understand the syllabi are equipped with the necessary resources, and have a good knowledge of which teaching strategies are most likely to address these aims (Postlethwaite and Ross, 1992).

In addition to teacher quality, lack of resources for the teaching and learning process has been identified as a factor of low performance in many schools. Pupils attending primary school in countries with low per capita incomes tend to have learned substantially less after similar amounts of time in school than have pupils in high-income countries. In low-income countries, the effect of school and it resources as well as teacher quality is comparatively greater on academic achievement in primary schools (Heyneman and Loxley, 1983). This data, which is more representative of the world's population of schoolchildren than those used in previous studies, illustrate that the "predominant influence on student learning is the quality of the schools and teachers to which children are exposed" (p.1162).

In cross-national studies, it is significant to take into consideration the number of years teachers have spent acquiring their education (Lundberg and Linnakyla, 1993). This period usually varies considerably across countries. To some extent, these variations reflect differences in how the teaching profession is valued in different countries. In some countries, teacher education provided at universities or at special teachers' colleges as a substantive higher education programme. In other countries, university studies oriented towards specific disciplines precede the specific teacher training. Policy makers generally assume that prolonged education will create more competent teachers and higher teaching quality. The varying patterns and the varying interpretations of the concept of teacher education make it difficult to compare the length of education across countries.

In the SACMEQ countries, for instance, the recruitment of candidates for teacher education is from secondary schools. For teachers of Grades 10 to12 the duration of training varies from two to four years. These differences in the teacher training approach may make a difference in teacher performance and consequently in pupil performance. One of the variables to take into consideration in the analysis of pupils' performance is the teachers' experience.

According to Lundberg and Linnakyla (1993), there is a relationship between teaching experience and student achievement. Teaching is a complex and demanding profession that requires skill in management and fast decision making, independent judgement, patience, empathy, communication skill, careful planning, stress tolerance, deep subject knowledge and psychological insight. One cannot acquire a high level of expertise within only a few years of practical teaching experience. Therefore, the more experienced the teacher is the better performance that can be expected from students. In the TIMSS study, more than 80% of students were taught by teachers who had at least some professional training in mathematics. More than 80% of students were taught by teachers who had at least some professional training in mathematics (Greaney and Kellaghan, 2008).

In New Zealand, major factors were identified as potentially responsible for the poor performance of primary school pupils in TIMSS which include poor understanding of mathematics by teachers, low morale of teachers, classroom disturbance and bullying, lack of appropriately challenging learning materials, ineffective implementation of intended curricula, and ineffective assessment procedures (Macnab, 2000).

The gender of a teacher makes some difference in pupils' performance as related to the teacher's performance. The data showed that 71% of primary school teachers were female. Across countries, the proportion of female to male teachers in primary schools was varied - "from 98% in Slovenia to only 46% in Indonesia" (Elley, 1992, p.40). In some countries, female teachers significantly outperformed male teachers. In the IEA Study of Reading Literacy for 9-year-olds (1991), "there were ten countries with strongly significant differences ($p<0.001$) between female and male teachers as to how their students performed on the reading tests (Canada, Cyprus, Greece, Hong Kong, Iceland, Indonesia, Spain, Sweden, Trinidad and Tobago, and Venezuela), and in all cases, female teachers had better students" (Lundberg and Linnakyla, 1993). Postlethwaite and Ross (1992) have also observed that schools that were more effective in reading had more female reading teachers than male teachers.

In contrast, in the IEA Study of Reading Literacy (1991) boys in Nigeria and in Germany achieved well and had more often been taught by male teachers than boys in Canada and the United States, where the boys faired less well than girls. A plausible explanation is that boys identify better with the values of male teachers than with those of female teachers (Elley, 1992, p.55). However, in many countries, students taught by female teachers scored higher than students taught by males, especially at lower grade levels.

From these results, one can conclude that it may be better for pupil performance to have female teachers in primary education in certain countries. But in the era of gender balance it is very difficult for decision makers to implement this proposition. It may be important to find out the reasons why female teachers have better results.

3.8 SUMMARY

A number of authors see competence as something describing an action, behaviour or outcomes that can be demonstrated, observed and assessed. According to Tomlinson (1995, p.181) "competence or skill signifies a more or less consistent ability to realize particular sorts of purposes to achieve the desired outcomes." A competent person is capable of certain acts or actions in the context in which the person has competence, and is likely regularly to achieve an intended outcome in that context.

Westera (2001) claims that the concept of competence is strongly associated with the ability to master complex situations - and it is assumed that "competence" transcends the possession of knowledge and skills to include the ability to explain how knowledge skills are applied accounts for the effective use of knowledge and skills in specific and concrete contexts. However, the mastery of relevant knowledge and skills alone is no guarantee of successful performances in complex environments. Individuals should be able to select from their available knowledge and skills in such way that efficient and effective behaviour occurs taking into account the characteristics of a specific context.

The conceptual framework defined by Cheng and Tsui (1998) for teacher effectiveness has the advantage of showing the model using three dimensions and three domains: cognitive, affective and behavioural; three levels: individual, group and school; four layers: teacher competence, teacher performance, student experience and student performance; and other important components of teacher effectiveness, such as the external teaching context and the internal teaching context, and the relationship between all of these.

From a professional point of view, competence is important and a distinct category through which to classify different professionals according to their performance. As in any evaluation it is very difficult to make a difference between different levels of competence and skills. Measurement of teacher competence in terms of student performance is often difficult because many variables are involved. Nevertheless, there seems to be a direct relationship between teacher training and pupil performance of the curriculum.

In primary schools, pupil outcomes are determined in some ways by teachers' competence. International studies have shown that in terms of pupil performance it can be observed that the difference between most developed countries is not very great, but that there are real, stable differences in reading literacy levels between nations. All of the developing countries tend to have lower achievement levels than the industrialized nations. In general, their economic position is weaker and they lack long-standing literacy traditions (Elley, 1992).

Reading skills are also a foundation on which the learning of all other subjects is established. Reading skills depends on the internal and external efficiency of the school system. Reading is a basic skill and plays an important role in the citizens' daily lives as well as in a country's development. In cross-international studies of reading and mathematics, the findings have shown that there are differences between the performance of girls and boys, where girls tend to have better results in reading than boys, but boys have better results in mathematics than girls.

Finally, it is crucial to take into consideration the different variables that have an effect on pupil performance, such as the teachers' characteristics and the quality of teaching and learning, the pupils' background and parental involvement, as well as the school's location and facilities.

The next chapter provides and discusses information about the SACMEQ II study in Mozambique, as well as cross-international studies.

CHAPTER 4

SACMEQ IN MOZAMBIQUE

INTRODUCTION

The purpose of this chapter is firstly to give a summary in table form of cross-national studies such as Progress in International Reading Literacy Study (PIRLS), Programme for International Student Assessment (PISA) and Third International Mathematics and Science Study (TIMSS) as a background to understanding the SACMEQ study. Secondly, the chapter aims to describe the main characteristics of the SACMEQ study in Mozambique, examining particularly at the crucial design and methodological issues involved in the implementation of the SACMEQ study, namely the planning of the study, instruments construction, sampling, data collection, data entry and data cleaning.

4.1 CROSS-NATIONAL STUDIES

Before describing the SACMEQ study, it is essential to set the context for cross-national studies internationally, particularly as nowadays there are several cross-national studies which monitor the quality of education in many countries across the world.

The International Association for the Evaluation of Educational Achievement (IEA) was founded in 1958 by a group of European and American researchers (Grisay and Griffin, 2004). Benjamin Bloom, one of founding fathers of IEA, and other members wanted to measure the achievement of comparable samples of students in different subjects and in different school systems, with a view of investigating the relationships between possible differences in achievement and differences in inputs, processes and educational contexts.

Most of the IEA comparisons are based on so-called “age/grade” samples. That is, the target population in each participating country is defined as all students attending the grade where most of the students in a given age cohort can be found. Table 4.1 below provides a summary of International Comparative Studies of Education.

Table 4.1

Summary of International Comparative Studies of Education[5]

Name of Study	Organisation	Year	Age of pupils	Content area	Number of countries
Pilot study	IEA	1959 - 1962	13	Mathematics, science, reading comprehension, geography, non-verbal reasoning	12
First International Mathematics Study (FIMS)	IEA	1961 - 1965	13, FS	Mathematics	12
The six-subjects study	IEA	1967 - 1976	10,14, FS	Science, reading comprehension, literature education, foreign languages (French & English), Civic Education	19 15 10 8, 10 10
Classroom Environment Study (CES)	IEA	1980-1984	9-15	Classroom Environment (mathematics, science and history)	11
Second International Mathematics Study (SIMS)	IEA	1976-1989	13, FS	Mathematics	20
Second International Science Study (SISS)	IEA	1979 - 1991	10, 14	Science	24
Written composition study	IEA	1980-1988	10, 14-16, FS	Written composition	14
First International Assessment of Educational Progress (IAEP)	IAEP[6] / ETS[7]	1988	13	Mathematics, science	5
Computers in Education Study	IEA	1986 - 1993	10,13	Computers in Education	21
Pre-Primary project (three phases)	IEA	1986-2002	3-5	Pre-primary education	11 – 15
Second International Assessment of Educational Progress	IAEP / ETS	1990-1991	9,13	Mathematics, Science	20
Reading Literacy Study	IEA	1985 - 1994	9,14	Reading literacy	31
TIMSS – Third International Mathematics and Science Study	IEA	1991-1998	9, 13, FS	Mathematics, science	45 - 55

[5] Some information is drawn from: (i) Goldstein, H. (1995). *Interpreting international comparisons of student achievement*. Educational studies and documents 63. Paris: UNESCO publishing; (ii) IEA Website. NOTE: the number of participating countries in a study may vary dependent on the phase or stage of a study.

[6] Source: Greaney and Kellaghan (1996). Monitoring the Learning Outcomes of Education Systems, World Bank, pp.25-27.

Name of Study	Organisation	Year	Age of pupils	Content area	Number of countries
Monitoring Learning Achievement I[8]	UNESCO	1992-1998	9	Numeracy, Literacy & Life Skills	50
Language Education Study	IEA	1993 - 1996	15 - 18	Second and Foreign Languages	25
SACMEQ I	IIEP	1995-1999	10	Reading	7
Monitoring Learning Achievement II	UNESCO	1999	9	Numeracy, Literacy & Life Skills	18[9]
Civics Education Study	IEA	1994 - 2002	14, FS	Civic Education	31
SITES (two modules)	IEA	1997-2003	Primary & Secondary	Information & Communication Technology in Education	26, 28
PISA	OECD	1997-2001	15	Reading, mathematics, science	31
TIMSS-Repeat	IEA	1997-2001	13	Mathematics, science	38
SACMEQ II	IIEP	2000-2004	10	Reading and mathematics	14
Trends in Mathematics & Science Study (TIMSS)	IEA	2001-2004	9,13	Mathematics, science	26,49
PIRLS I	IEA	1999-2004	10	Reading Literacy	35
PIRLS II	IEA	2003-2007	10	Reading literacy	45
PISA II	OECD	1997-2005	15	Reading, mathematics, science	41

Source: Howie and Plomp, 2005, pp.6-7

Legend: FS – Final year of schooling varies across countries
ETS – Education and Testing Service, Princeton, USA.
Year – refers to the duration of the project (from approval to formal closure)

The IAEP studies were international replications of the USA's National Assessment of Educational Progress (NAEP) programme. These were organised by the Educational Testing Service in the USA. Only 2 surveys of science and mathematics were undertaken with the principal decision-making located in Education Testing Services (ETS). No future studies are planned.

As can be seen in Table 4.1 above, from 1959 to the present day there have been several cross-national studies focusing on pre-primary to secondary education and teacher training. These studies have covered several subjects such as mathematics, geography, science, reading comprehension, reading literacy, non-verbal reasoning, literature education, foreign languages (French and English), civic education, written composition, computers in education, life skills, pre-primary education, the classroom environment (mathematics, science and history), and information and communication technology in education. These studies were coordinated by many organizations

[8] This study was not intended as an international comparative study as data were collected over varying periods of time and were therefore not comparable at one point in time.
[9] The 1999 project involved 18 countries in Africa. The data is available for only 11 of the 18 countries.

and involved many countries. One such study was the SACMEQ study and general information about SACMEQ in Mozambique is provided in the next section.

4.2 SACMEQ IN MOZAMBIQUE

Since Mozambique's independence in 1975, many small research studies, which have not been nationally representative, have been undertaken by the Ministry of Education and the universities. One exception to this observation is a nationally representative study conducted under the auspices of the Southern and Eastern Africa Consortium for Monitoring Educational Quality (SACMEQ), which was implemented in 2000.

4.2.1 Overview of the SACMEQ Study in Mozambique

The Southern and Eastern Africa Consortium for Monitoring Educational Quality consortium (SACMEQ) represents fifteen Ministries of Education in fourteen countries across the Southern African region, namely Botswana, Kenya, Lesotho, Malawi, Mauritius, Mozambique (since 1996), Namibia, Seychelles, South Africa, Swaziland, Tanzania (Mainland), Tanzania (Zanzibar), Uganda, Zambia, and Zimbabwe. The International Institute for Educational Planning (IIEP) became a member of SACMEQ in 1997.

The first two educational policy research projects undertaken by SACMEQ, commonly known as *SACMEQ I* (1995) and *SACMEQ II* (2000), were designed to provide assessment information about conditions in primary schools and the quality of education provided by the primary education systems. The two projects gathered overlapping data in 1995 and 2000, two different time points, with the result that SACMEQ I provided valuable baseline information for SACMEQ II.

Five Ministries of Education completed the SACMEQ I project in 1998 (Mauritius, Namibia, Tanzania/Zanzibar, Zambia and Zimbabwe) and two in 2000 (Kenya and Malawi). In the year 2000 fourteen Ministries completed SACMEQ II field work. In 2004 the SACMEQ National Research Co-ordinators prepared national educational policy reports on the findings of this research, which were subsequently published by the IIEP. These reports suggested policy agendas for government action on issues related to baseline indicators for educational inputs, the general conditions of schooling, equity assessments for human and material resource allocations among schools, and pupil literacy levels.

The importance and benefits of SACMEQ can be seen from two different perspectives. One perspective covers the Mozambican national system of education whilst the other is related to broader benefits for education systems within the entire Southern African region. SACMEQ II is one of the few known research projects that have carried out a cross-national study in Mozambique using a truly representative sample. Generally, the studies carried out in the field of education in Mozambique are restricted in scope and do not employ truly representative national samples in their design (Passos, Nahara, Magaia and Lauchande, 2005, p.9). Consequently SACMEQ II promised to provide not only a great training opportunity for local team members on how to conduct a large-scale research project, but also to provide valid and reliable data on which important decisions could be based. Specifically, SACMEQ II promised to provide relevant, high quality data about the academic profile of teachers, the level of performance in the areas assessed, school management and other issues that are relevant for policy making.

Many advantages are apparent within the educational context of the region also. As a Portuguese speaking country, Mozambique has a unique history, tradition and system of education that is different from that of the other participating countries. The data collected through SACMEQ II can be considered to be of vital importance for Mozambique's education system, since it can provide the country with important data to promote a reflection on its primary education sector, identify the position of Mozambique's education system within the region, and work towards its improvement.

Despite these clear benefits, a practical implementation problem arose from the SACMEQ study in Mozambique. The school children in Mozambique, being more experienced in answering short answer type questions, were not used to multiple-choice questions, which formed a central part of the SACMEQ assessments. This unfamiliarity could have affected pupils' achievement results (Passos, Nahara, Magaia and Lauchande, 2005, p.10).

4.2.2 Planning of the SACMEQ II Study

This section refers to SACMEQ II specifically. The phases and stages described in Figure 4.1 below were followed in all of the SACMEQ countries, as the countries used standardised procedures to carry out the study[10].

[10] Further information relate to methodology of SACMEQ II study can be found in Chapter II of the SACMEQ II Country Reports available at : www.sacmeq.org.

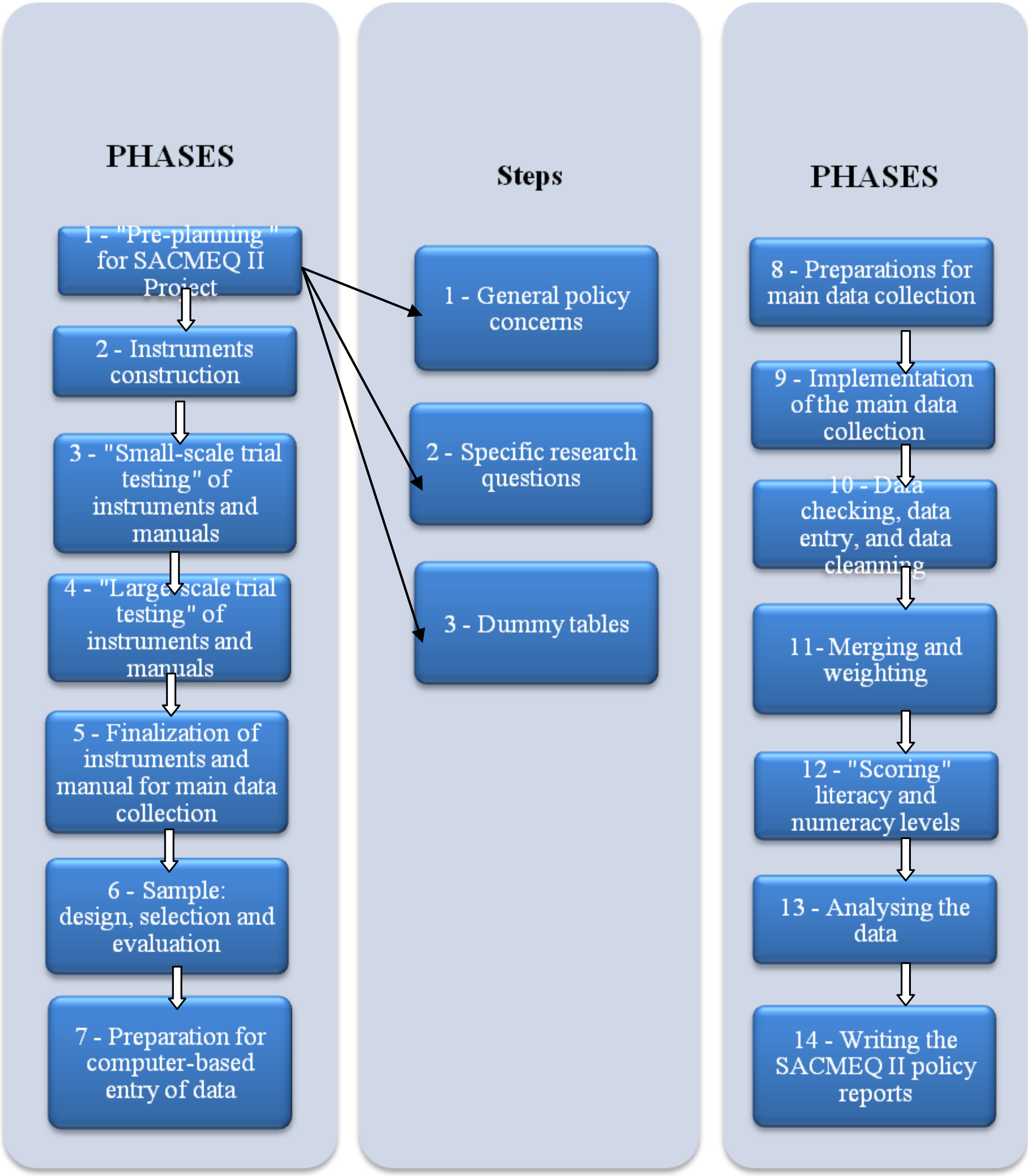


Figure 4.1 Outline of standardised phases and stages for the SAQMEC II study

As indicated in Step One of Figure 4.1, the very first stage was to identify the major policy concerns that were of interest to the Ministries of Education in the fourteen countries actively participating in SACMEQ II. These policy concerns and the specific research questions emanating from them had to be identified before the study could begin. In each of the countries, the SACMEQ National Research Co-ordinators (NRCs) were responsible for discussions with the senior members in their ministries of education about the high-priority policy concerns associated with their education systems. The responses were then analysed in order to identify groups of so-called

'General Policy Concerns'. In all, twenty general policy concerns were identified. These were summarised under five themes:

- ❖ Pupils' characteristics and their learning environments.
- ❖ Teachers' characteristics and their views about teaching, classroom resources, professional support, and job satisfaction.
- ❖ School Heads' characteristics and their views about educational infrastructure, the organization and operation of schools, and problems with pupils and staff.
- ❖ Equity in the allocation of human and material resources among regions and among schools within regions.
- ❖ The reading and mathematics achievement levels of pupils and their teachers.

Specific research questions were developed for each of the twenty general policy concerns, and a dummy table was developed for each specific research question. The main reasons for producing the dummy tables were that this process forced the NRCs to (a) check that the data collection instruments covered all information needs, (b) ensure close linkages between the specific research questions and the questions on the data collection instruments, (c) reach agreement on the selection of variables and the types of data analyses to be applied, and (d) design and justify the data tabulation templates to be used in reporting the data analyses. It is essential to note that this approach meant that the study was based solely on what the participating ministries had deemed to be important within the general policy concerns. All in all, there were 20 general policy concerns that encompassed 75 specific research questions and resulted in around 150 dummy tables (Passos, Nahara, Magaia and Lauchande, 2005, p.11).

4.2.3 Instrument Construction

This section presents and discusses the construction process undertaken to develop instruments for the SACMEQ study.

4.2.3.1 Dummy table construction

Each of the 150 dummy tables included the names of variables to be used as well as the form in which they would be analysed. These variables were listed and most of them could be regarded as variables for which information would be required from pupils, teachers, or school Heads using questionnaires. A few of the variables required information to be collected from pupils and teachers using tests (Passos, Nahara, Magaia and Lauchande, 2005, p.12).

4.2.3.2 Questionnaire construction

The variables in the dummy tables were listed and a decision had to be made for each variable about the number of questions that would be required to construct each variable. In some cases (e.g. pupil gender) only one question was needed. For another variable (e.g. school enrolment) two questions were combined (boys' enrolment and girls' enrolment). In yet other cases, several variables had to be formed into a construct (e.g. 'possessions in the home,' 'quality of home' and 'parental education' to form a construct known as 'home background'). Since many of the variables were to be used for examining change over time it was important to use the same questions as had been used in SACMEQ I as far as possible. Questions were developed for each variable or each sub-part of a variable as required. These questions were then trialled in the pilot study and, where necessary, revised (Passos, Nahara, Magaia and Lauchande, 2005, p.12).

4.2.3.3 Test construction

Tests had to be constructed in reading and mathematics both for pupils and for teachers. The two sets of tests (for pupils and teachers) had to be calibrated so as to be on the same scale. For the pupil tests, there was also the intention to compare reading scores with the International Association for the Evaluation of Educational Achievement (IEA) Reading Literacy study, and mathematics scores with the IEA's Third International Mathematics and Science Study (TIMSS). Hence, there had to be common items**.** These tests aligned to the IEA studies. Most importantly, the pupil tests were designed to be congruent with the content (domains) and behaviours (skills) derived from detailed analyses of the curricula, syllabi, exams, and textbooks used in the SACMEQ countries. The selection of teacher test items had to cover the full range of pupil item difficulties and did not contain too many easy pupil test items. In addition, in order not to overburden teachers with an extended testing session, the teacher tests had a much smaller number of test items than the pupil tests (Passos, Nahara, Magaia and Lauchande, 2005, p.13).

Immediately after the test blueprints had been developed, the NRCs worked in teams to either select or write all of the required test items for the SACMEQ II tests. As items were prepared, they were classified according to the cells in the test blueprints. Twice as many items as required were prepared for each cell, so that the rejection of poor items after the trial testing did not result in a shortage of items in some cells. Most test items were in multiple-choice format with four options per item. The item pools were then sent to all countries for review by panels of curriculum specialists. This process resulted in editorial changes to the items and recommendations for additional items by the panel members, who made sure that the items met the requirements of the respective national curricula.

Reading tests

For the reading test component, "reading literacy" was defined as "the ability to understand and use those written language forms required by society and/or valued by the individual" (Passos, Nahara, Magaia and Lauchande, 2005). This definition had been used in SACMEQ I and also in the IEA Reading Literacy Study. The reading domains to be assessed were:

- **Narrative prose:** Continuous text in which the writer aims to tell a story – whether this story be fact or fiction;
- **Expository prose:** Continuous text in which the writer aims to describe, explain, or otherwise convey factual information or opinion to the reader; and
- Documents: Structured information organized by the writer in a manner that requires the reader to search, locate, and process selected facts, rather than to read every word of a continuous text.

At the same time, a hierarchy of skills was proposed (a dimension of increasing competence) that could be applied to both of the SACMEQ studies. There was a total of 83 test items in the final version of the SACMEQ II reading test for pupils (Passos, Nahara, Magaia and Lauchande, 2005, p.13), whose distribution is shown in the Box 1.

Box 1 Reading domain and skill levels for pupils

	Domains				**Skill levels**					
Reading	**Narrative**	**Expository**	**Documents**	**Total**	**1**	**2**	**3**	**4**	**5**	**Total**
	32	26	25	83	6	22	26	18	11	83

Mathematics tests

A similar exercise was undertaken for mathematics, except that as there had been no SACMEQ I test in mathematics, there was no historical basis for comparisons. The domains decided upon were:

- **Number:** Operations and number line, square roots, rounding and place value, significant figures, fractions, percentages, and ratios;
- **Measurement**: Measurements related to distance, length, area, capacity, money, and time; and
- Space-Data: Geometric shapes, charts (bar, pie, and line), and tables of data.

In the final version of the SACMEQ II pupil mathematics test, there was a total of 63 test items distributed in three domains and five skill levels, as outlined in Box 2 (Passos, Nahara, Magaia and Lauchande, 2005, p.14).

Box 2 Mathematics domain and skill levels for pupils

	Domains				Skill levels					
Mathema-tics	**Number**	**Measurement**	**Space-Data**	**Total**	**1**	**2**	**3**	**4**	**5**	**Total**
	27	18	18	**63**	6	20	17	12	8	**63**

Teacher tests

The main challenge in the construction of the reading and mathematics tests for teachers, was to "fine-tune" the difficulty range of test items so that it would suit the higher levels of competence that were expected of teachers. At the same time, it was important to ensure that there was sufficient "item overlap" with the pupil tests to permit the performance of teachers and pupils to be measured on the same scale.

Several passages were selected in the reading test for teachers because of the more subtle nature of the messages that they conveyed, and the less-visible underlying assumptions of the writers. For example, one passage on the topic of 'smoking' required the teachers to identify the unstated values and beliefs of the writer. Another passage on the topic of "effective thinking" required the teachers to identify assumptions made by the writer about the readers and their knowledge of the topic. These kinds of skills were far beyond the competencies that had been required in the Grade 6 pupil tests.

The "extra" reading and mathematics items for teachers were expected to assess the higher competence levels of teachers without these items being so difficult that the teachers would be daunted by the challenge. In addition, the selection of easier test items that "overlapped" with the pupil tests had to be made with extreme care, because the teachers may have felt insulted if these items were ridiculously easy or if they were concerned with issues that would interest only young children.

The extended levels of competence in the teachers' reading test focused mainly on expository texts rather than on documents or narratives. It was felt that the use of narratives and documents at this level would have required very complex and long texts that would have generally extended the time required to complete the test. The extended levels of competence in the teachers' mathematics test mainly emphasized problem solving strategies that required the extraction of information from verbal, graphic, or tabular presentations. For these items, the teachers were expected follow three steps:

(1) to identify the nature of the problem; (2) to transform the problem into mathematical language; and (3) to solve the problem. In some cases, this expectation required the rearrangement of information, and in others it meant translating the problem into one or more equations and then solving the equations (Passos, Nahara, Magaia and Lauchande, 2005, p.14).

4.2.4 The Mozambican Sample

The desired target population for Mozambique was all pupils enrolled in Grade 6 in the ninth month of the school year (i.e., in September 2000) which resulted in 509 schools with 112 279 pupils in Grade 6. However, it was decided to exclude certain pupils in Mozambique. These were pupils in schools having fewer than 20 Grade 6 pupils enrolled for the year, and pupils in schools for learners with special educational needs. Overall, 106 pupils from nine schools were excluded based on these criteria, which amounted to 0.1 percent of all potential pupil participants. After excluding the 0.1 percent of pupils, the defined population from which a sample had to be drawn consisted of 112 173 pupils from 500 schools. The net enrolment ratio in Mozambique in 2000 was 54.7%.

The number of schools required in the sample was, in part, a function of the intra-class correlation (rho), which is an indicator of the proportion of variation (in achievement in this case) among schools of total variation. The following is the formula often used for estimating the value of rho in situations where two-stage cluster sampling is employed using (approximately) equal sized clusters (Passos, Nahara, Magaia and Lauchande, 2005, p.21):

$$\text{estimated rho} = (b.\ s(a)^2 - s^2) / (b - 1)s^2$$

where $s(a)^2$ is the variance of cluster means, s^2 is the variance of the element values, and b is the cluster size. An rho of 0.40 was used. This meant drawing a sample of at least 172 schools, but additional schools were selected with the aim of achieving reasonably stable sample estimates within regions. It was planned that 179 schools would participate in the Mozambican study.

The number of schools (179) and pupils in the planned and achieved samples is presented in Table 4.2. The sample was stratified into provinces, school location, school characteristics and the number of schools required for each region.

Table 4.2

Number of schools and pupils in the planned and achieved samples

Provinces	Planned		Achieved		Percent achieved	
	Schools	Pupils	Schools	Pupils	Schools %	Pupils %
Cabo Delgado (1)	10	200	10	182	100	91
Cabo Delgado (2)	4	80	4	75	100	94
Gaza	15	300	15	296	100	99
Inhambane	15	300	14	255	93	85
Maputo Cidade (1)	14	280	14	248	100	89
Maputo Cidade (2)	6	120	6	100	100	83
Manica (1)	11	220	11	194	100	88
Manica (2)	4	80	4	78	100	98
Maputo Província (1)	13	260	13	247	100	95
Maputo Província (2)	2	40	2	34	100	85
Nampula (1)	16	320	16	282	100	88
Nampula (2)	4	80	4	72	100	90
Niassa (1)	12	240	12	190	100	79
Niassa (2)	3	60	3	45	100	75
Sofala (1)	13	260	13	236	100	91
Sofala (2)	2	40	2	39	100	98
Tete (1)	12	240	12	215	100	90
Tete (2)	3	60	3	56	100	93
Zambézia (1)	18	360	16	294	89	82
Zambézia (2)	2	40	2	39	100	98
Mozambique	**179**	**3580**	**176**	**3177**	**98**	**89**

Source: Data from SACMEQ II database, 2004

In total, 89% of the planned number of pupils was represented in the final sample drawn from 98% of the schools. The reason for the shortfall in learner numbers was the absenteeism of some learners in some of the schools on the day of data collection. The reason for the shortfall in school numbers was that some schools had been integrated into others and other schools were in inaccessible areas. However, sampling weights were used to correct for disproportionality among strata in the calculation of all statistics.

Sample validity

Sampling validity gives information on the extent to which the sample represents the population. Table 4.3 shows the sample validity in Mozambique.

Table 4.3

Sample validity in Mozambique

Provinces	**No. of schools**		**Age**		**Gender (female)**	
			Mean Years	**Mean years**		
	Country	**Sample**	**Country**	**Sample**	**Country**	**Sample**
CAB	31	14	14.8	16.7	30.6	26.8
GAZ	73	15	14.2	14.8	47.3	49.2
INH	70	15	14.1	14.7	43.5	43.7
MAC	42	20	13.8	14.2	48.7	48.8
MAN	39	15	13.9	14.8	32.9	33.5
MAP	38	15	14.1	14.4	49.7	54.1
NAM	72	20	14.3	15.0	28.2	29.5
NIA	25	15	14.4	15.3	28.9	31.9
SOF	42	15	13.5	14.3	37.1	34.5
TET	37	15	13.6	14.6	33.9	38.3
ZAM	77	20	13.9	15.0	27.3	32.0
MOZ	**546**	**179**	**14.0**	**14.7**	**38.5**	**40.3**

Source: Data from MINED Direcção de planificação

Table 4.3 compares the socio-demographic information like age and gender relating to the sample with that relating to the population of Grade 6 pupil in the country as a whole. It seems as if there is no significant difference between the sample mean age (14.7) and the population mean (14) of Grade 6 pupils for the country. However, there are some differences among the provinces. For instance, in Cabo Delgado the difference is close to two years. The pattern is similar to that in the gender variable.

4.2.5 Data Collection

Fieldworkers were employed to collect data. Data collection manuals had been written indicating what the data collectors had to do from when they entered a school to when they returned the package of instruments to the regional office. A team of 24 data collection team leaders was centrally trained in Maputo in August 2000 to ensure uniformity in data collection throughout the country. The training was repeated in the provinces for more familiarity with the data collection manual and for the benefit of the assistant data collectors. The schools were notified about the data collection several weeks in advance. When the data collectors arrived at the school, they had to meet with the School Head to verify the details of the school and what was required. They had to ensure a testing room in which 20 well-placed sitting and writing places were available. They then had to further ensure that the class registers were available and that the selected learners were present (Passos, Nahara, Magaia and Lauchande, 2005, p.23).

Reliability

Some of the domains and constructs in the framework are composed of several indicators. Principal components analysis (PCA) was used in order to group the indicators into one factor. Reliability was calculated for those groups of variables. The Cronbach's alpha-coefficient was computed for each group of items using PCA. The bench mark 0.7 was used as a reliability dimension or component.

The main data collection took place on two consecutive days, 28 August and 1 September 2000. On the first day, fieldworkers administered the learner questionnaire and the reading test in addition to the school Head questionnaire, the teacher questionnaire and the teacher test. Upon leaving the school, fieldworkers had to check all of the information collected before returning to the school the following day for the administration of the learner mathematics test.

4.2.6 Data Entry and Data Cleaning

A ten-person team (university students, teachers and data-centre keyboard operators) was recruited and trained in the use of WINDEM, a special data entry package used by SACMEQ to enter all of the data. The data entry took about two months.

At the end of this procedure, the data files were sent by email to the unit "Monitoring Educational Quality" at the IIEP in Paris. Many consistency checks were made for many variables as well as for the identification codes used. The first data files were sent to Paris in February 2001, and after 2 years of exchanges between national teams and IIEP staff, the files were finally declared to be clean on 27 January 2003 (Passos, Nahara, Magaia and Lauchande, 2005, p.24). The reason for this delay was that there was no data verification during the data entry process.

4.2.7 The Calculation of Scale Scores (Rasch)

The data from the trial-testing phase were subjected to Rasch[11] analysis, if item that did not fit the Rasch Model, possibly it did not measure the construct in question. In other words, through investigating differential item functioning one could also detect items that were "behaving differently" across subgroups of respondents defined by gender and country. The poor quality test

[11] Georg Rasch developed the Rasch model in the 1950s. It is a probabilistic model by which linear measures are created to be used in subsequent parametric tests. One of the assumptions of the Rasch model is that a relatively stable latent trait or construct underlies test results (Boone and Rogan, 2005). The Rasch model may also be the only model whereby a scale can be constructed that is separable or invariant to the abilities of the persons tested (Bond and Fox, 2007).

items were rejected, keeping in mind the need to prepare a “balanced” test across skill levels and domains.

In the case of the measurement of reading performance, there were three groups of respondents: the SACMEQ I pupils, the SACMEQ II pupils, and the SACMEQ II teachers. Each group completed a reading test that was “different but overlapped.” That is, each group completed a reading test that included some unique test items and some items that also appeared on one or both of the other two tests. In the case of numeracy measurement, the tests were also “different but overlapped,” but only the SACMEQ II pupils and SACMEQ II teachers completed these tests.

Although data were gathered at different time points for the SACMEQ I (1995-1997) and SACMEQ II (2000-2002) projects, it is possible to think of the reading and mathematics tests used in the projects as two “artificial” or “composite” tests of 148 different reading items and 91 mathematics items respectively, as shown in Box 3. This conceptualisation of the tests implies that the three sets of reading test respondents and the two sets of mathematics test respondents can each represent a single group of respondents for the purposes of undertaking “concurrent” scaling of the tests using the Rasch Model (Passos, Nahara, Magaia and Lauchande, 2005, p.16).

Box 3 Distribution of items over SACMEQ tests

	SACMEQ 1	**SACMEQ II**	**SACMEQ II TEACHERS**	**More than 1 test**	**TOTAL**
Reading	36	52 of 83	26	34	**148**
Mathematics		50 of 83	28	13	**91**

For the 148-item “composite” reading test, there were 36 items that came only from the SACMEQ I pupil reading test, 52 test items that came only from the SACMEQ II pupil reading test, and 26 items that came only from the SACMEQ II teacher reading test. An additional 34 items were located in more than one test. For the 91-item “composite” mathematics test, there were 50 items that came only from the SACMEQ II pupil mathematics test, and 28 items that came only from the SACMEQ II teacher mathematics test. An additional 13 items were located in both tests.

Both the reading and mathematics data matrices were analysed using computer software that applied the Rasch Model of measurement (Andrich and Luo, 2000, as cited in Ross, Saito, Dolata, Ikeda and Zuze, 2004). The first step was to calibrate the test items by calculating the Rasch difficulty values for each item within the 148-item reading test and the 91-item mathematics test. The results of the calibration were then used to calculate reading and mathematics scores for all pupils and teachers in all countries.

The final test was deemed to be valid. In each of the SACMEQ countries, the Ministry specialists were asked to identify those items that were in the curriculum. These items were named ‘essential’ items, and formed a subset of all the items in the test. The correlation between the ‘essential’ items and all items was 0.99. Indeed, in order to ensure that it was fair to compare all countries on the total test score the correlations between the “essential” items and all items were calculated in every country, and in all cases the results were between 0.98 and 1.00, which confirmed that the tests were valid for Mozambique and also for other countries.

For both reading and mathematics, the mean for all SACMEQ countries was set at 500 (from 1000) and the standard deviation at 100. For Mozambique, the mean pupil score for reading was 517. The mean teacher reading score for all SACMEQ countries was 733, while the mean for Mozambican teachers was 715. This set of outcomes meant that in reading, the Mozambican learners scored above the SACMEQ mean while the teachers scored below the SACMEQ mean (Passos, Nahara, Magaia and Lauchande, 2005, p.17).

4.2.8 The Identification of ‘Derived’ Skill Level

For each set of tests (pupil and teacher for reading and pupil and teacher for mathematics), the items were first arranged in order of difficulty and then examined item by item in order to describe the specific skills required to provide correct responses. When items had been linked to specific skills, they were placed into groups or clusters of test items such that the items in each group had similar difficulty values and shared a common “theme” with respect to the underpinning competencies required to provide correct responses.

The three tasks of (1) defining specific skills for each test item; (2) identifying groups of items with similar difficulties; and then (3) naming the “theme” (or competency level) linked with each group were extremely difficult. This difficulty arose because it required the National Researchers Co-ordinators (NRCs) to first reach agreement on how the respondents arrived at correct solutions, and then to name the competency required. These tasks required the NRCs to use their practical knowledge of the ways in which pupils solve problems, and then to portray this insight with a meaningful description of the thought processes that had been applied. The skills audit for the reading and mathematics tests resulted in the identification of eight levels of competence for each test. This number of levels was more than had been proposed in the test blueprints. For both tests, there was a strong correspondence between the descriptions of the five blueprint levels and most of the derived levels arising from the skills audit, which suggested that the three “extra” levels were defining more detail on the same reading and mathematics scales.

An abbreviated version of skill levels has been presented in Table 4.4. It will be seen that the levels are hierarchical. The low level represents the pre-reading level in which the pupil matches words and pictures, while the highest level represents the critical reading in which the pupil locates information in longer texts and combines information to infer and evaluate it. It is then possible to calculate the percentage of pupils reaching any one level. These levels have been presented in Chapter 8 in this thesis. These levels can be regarded as being more meaningful than other scores because the competency levels descriptions indicate exactly what pupils can and cannot do (Passos, Nahara, Magaia and Lauchande, 2005, p.8).

Table 4.4

The final skill levels for the SACMEQ reading and mathematics tests

Level	Reading	Mathematics
1	Pre-reading: Matches words and pictures involving concrete concepts and everyday objects. Follows short simple written instructions	Pre-numeracy: Applies single step addition or subtraction operations. Recognises simple shapes. Matches numbers and pictures. Counts in whole numbers.
2	Emergent reading: Matches words and pictures involving prepositions and abstract concepts; uses cuing systems (by sounding out, using simple sentence structure, and familiar words) to interpret phrases by reading on.	Emergent numeracy: Applies a two-step addition or subtraction operation involving carrying, checking (through very basic estimation), or conversion of pictures to numbers. Estimates the length of familiar objects. Recognises common two-dimensional shapes.
3	Basic reading: Interprets meaning (by matching words and phrases, completing a sentence, or matching adjacent words) in a short and simple text by reading on or reading back.	Basic numeracy: Translates verbal information presented in a sentence, simple graph or table, using one arithmetic operation in several repeated steps. Translates graphical information into fractions. Interprets place value of whole numbers up to thousands. Interprets simple common everyday units of measurement.
4	Reading for meaning: Reads on or reads back in order to link and interpret information located in various parts of the text.	Beginning numeracy: Translates verbal or graphic information into simple arithmetic problems. Uses multiple different arithmetic operations (in the correct order) on whole numbers, fractions, and/or decimals.
5	Interpretive reading: reads on and reads back in order to combine and interpret information from various parts of the text in association with external information (based on recalled factual knowledge) that 'completes' and contextualizes meaning.	Competent numeracy: Translates verbal, graphic, or Tabular information into an arithmetic form in order to solve a given problem. Solves multiple-operation problems (using the correct order of arithmetic operations) involving everyday units of measurement and/or whole and mixed numbers. Converts basic measurement units from one level of measurement to another (for example, metres to centimetres).
6	Inferential reading: Reads on and reads back through longer texts (narrative, document, or expository) in order to combine information from various parts of the text so as to infer the writer's purpose.	Mathematically skilled: Solves multiple-operation problems (using the correct order of arithmetic operations) involving fractions, ratios, and decimals. Translates verbal and graphic representation information into symbolic, algebraic, and equation form in order to solve a given mathematical problem. Checks and estimates answers using external knowledge (not provided within the problem).
7	Analytical reading: Locates information in longer texts (narrative, document, or expository) by reading on and reading backing order to combine information from various parts of the text so as to infer the writer's personal beliefs (value systems, prejudices, and/or biases).	Problem solving: Extracts and converts (for example, with respect to measurement units) information from tables, charts, visual and symbolic presentations in order to identify, and then solves multi-step problems.
8	Critical reading: Locates information in longer texts (narrative, document, and expository) by reading on and reading back in order to combine information from various parts of the text so as to infer and evaluate what the writer has assumed about the topic and the characteristics of the reader – such as age, knowledge, and personal beliefs (values systems, prejudices, and/or biases).	Abstract Problem Solving: Identifies the nature of an unstated mathematical problem embedded within verbal or graphic information, and then translate this into symbolic, algebraic, or equation form in order to solve the problem.

Source: SACMEQ II database, 2004

In SACMEQ I, each of the Ministries of Education established expert national committees that included inspectors, teacher leaders, and teachers. The committees were asked to identify the reading performances that they would expect from a pupil who (a) would barely survive during the next year of schooling (the "Minimum" level), and (b) was guaranteed to succeed during the next year of schooling (the "Desirable" level). It was the average cut-off levels that were established in SACMEQ I that were used in SACMEQ II. However, this process occurred only for reading, because reading was the only subject matter tested in the SACMEQ I Project. It was thought that this comparison of SACMEQ's would be one further indicator of importance for policy-makers (Passos, Nahara, Magaia and Lauchande, 2005, p.20).

Some of the domains and constructs of which the conceptual framework is composed consist of several indicators. Principal components analysis (PCA) was used in order to group the items in one indicator, and reliability (need more explanation) was calculated for those groups of variables.

4.3 SUMMARY

As indicated in this chapter, SACMEQ used the same instruments, common definitions of target population and standardised procedures to measure pupils' achievement and teacher performance. The steps described in this chapter were undertaken in all SACMEQ countries participating in the study. Planning activities, the construction of the instruments (tests and questionnaires), sampling, data collection, capturing and analysis procedures as steps in the SACMEQ research process were discussed. The main findings associated with the data are described in Chapters 6, 7 and 8.

CHAPTER 5

THE CONCEPTUAL FRAMEWORK, RESEARCH DESIGN AND METHODS

INTRODUCTION

The aim of this chapter is to describe and discuss the conceptual framework of the study, which was adapted from Cheng and Tsui's (1998) model of total teacher effectiveness, to reflect the African educational context and the available SACMEQ database, inclusive of provincial-, national- and regional-level data. Cheng and Tsui's model includes important components relating to teacher competence and pupil performance, such as the internal and external teaching context, pre-existing pupil characteristics, and student experiences. The model also includes cognitive, affective and behavioural domains on three levels, those levels being the school, the group and the individual.

A conceptual framework is like a map (Dewey, 1938, p.402) which assists the researcher in navigating through the process of research. Some conceptual frameworks are ready-made but some must be created or adapted from the theory.

The research design, a secondary study using data from the SACMEQ II study conducted in Mozambique and other SAQMEC countries in 2000, is also described and discussed in this chapter. The conceptual framework is discussed in Section 5.1. This discussion is followed by the outlining of the research questions in Section 5.2. Design issues, specifically sampling, the instruments and procedures are then presented in Section 5.3. Finally, the data analysis plan is summarized in Section 5.3.6 and a summary of the chapter is presented in Section 5.4.

5.1 THE PURPOSE OF THE RESEARCH

The purpose of this study is to describe and explore the main factors that have an effect on Grade 6 teacher competence and pupil performance in the mathematics and reading tests in the SACMEQ II study conducted in Mozambique and some other SACMEQ countries. The first part of the study describes teacher performance and teacher competence as measured by pupil performance in

Mozambique and the other SACMEQ countries in the mathematical and reading tests. The analysis will take into consideration the multiple factors that may influence teacher and pupil performance, such as pupil background, school conditions, parents' education and the availability of textbooks, for example. In the second part of the study, contextual factors are explored and analysed in relation to teacher competence, in an attempt to identify significant predictors of teacher competence in Mozambique and selected SACMEQ countries.

5.2 CONCEPTUAL FRAMEWORK

To understand the conceptual framework and continue the discussion in this chapter, it is important to make a distinction between three central concepts used throughout, competence, competency and competencies, as defined below:

> *Competence can be regarded as a matter of degree. In other words, the more competencies a teacher has, the more competent the teacher is. Competence is conceived of as a matter of repertoire.*
>
> *Competency is defined in terms of what the teacher knows, believes, or can do, not in terms of what the teacher can get pupils to do. "Skill in classroom management" can be a competency whereas "Ability to manage a class" cannot. Competency does occur in the plural. It is customary to regard a competency as something that is either present or absent.*
>
> *Competencies refer to the knowledge, skills, and beliefs in a teacher's repertoire* (Medley, 1982, p.1894).

A review of the literature, as described in the previous chapter, has led to Tomlinson's (1995, p.181) definition of competence, namely:

> *Competence or skill signifies a more or less consistent ability to realise particular sorts of purposes to achieve desired outcomes. A competent person is capable of certain acts or actions: such a person is capable of the actions required to achieve the kind of intended outcome in question.*

Tomlinson's definition has been adapted for this research to include the focus of the study in terms of the specific outcomes of reading and mathematics in the following manner:

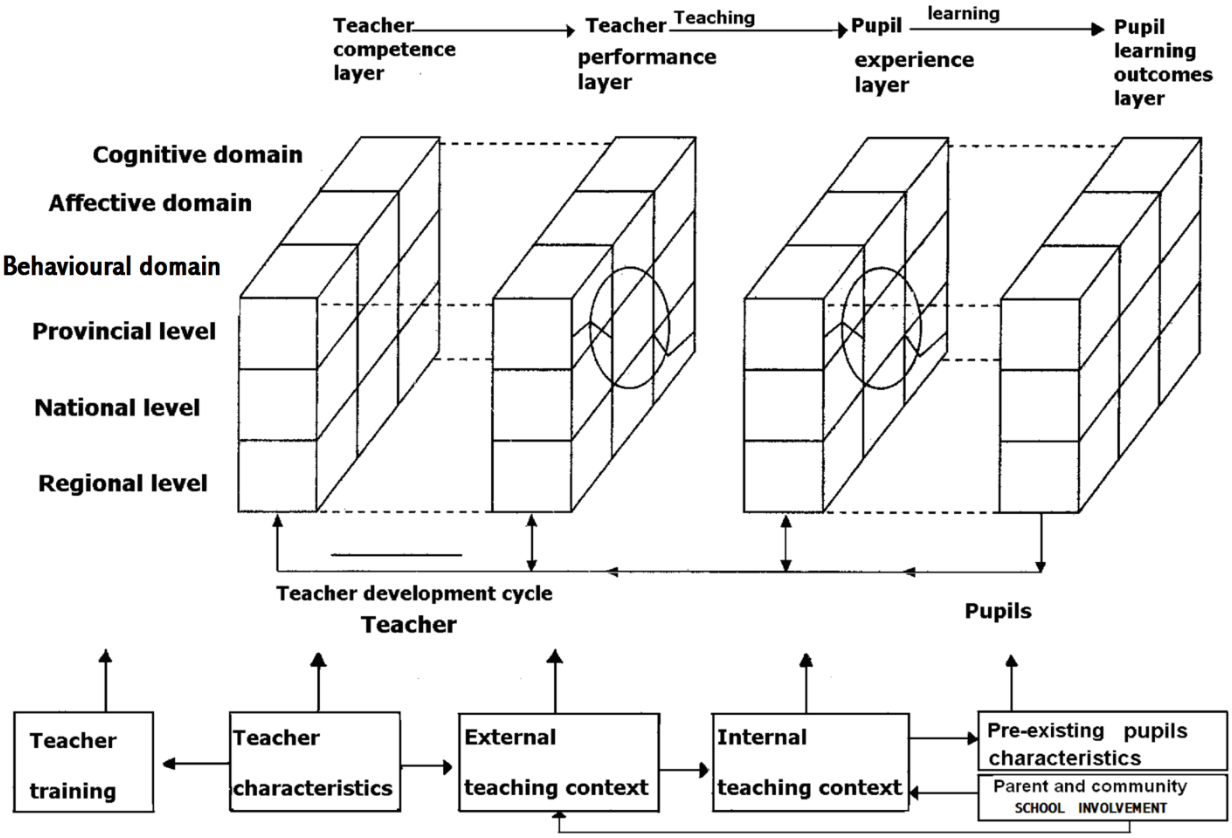
Teacher competence is the consistent ability to realise particular sorts of purposes to achieve desired outcomes in reading and mathematics.

Many models of teacher effectiveness have informed this study. As explained in Chapter 3, two significant models have emerged, the first by Medley (1982) and the second by Cheng and Tsui (1998), who further develop Medley's model. The conceptual framework for this study, as adapted from Cheng and Tsui (1998), will be presented and discussed in the following sections.

5.3 ADAPTED MODEL OF TOTAL TEACHER EFFECTIVENESS

As indicated in Chapter 3, it became clear after analysis of the existing frameworks on total teacher effectiveness, that there were explicit gaps in the literature. These gaps were addressed in Section 3.4 of Chapter 3, and are now further discussed in the conceptual framework for this study, which is a total teacher effectiveness model based on the two models previously referred to.

In this study, the term teacher effectiveness will refer to the results that the teacher or pupils achieved in the SAQMEC II reading and mathematics tests. Cheng and Tsui's (1998) model has been modified and adapted so as to relate it to the African education systems and social contexts under study and to align it to the data available for this study. Figure 5.1 reflects the changes that have been made to the model, which will now be discussed.



Source: Adapted from Cheng and Tsui, 1998

Figure 5.1 Key elements related to teacher effectiveness

- The three levels "individual," "group" and "school" were changed and renamed as the provincial, national and regional levels to reflect the existing SACMEQ database.
- The original model refers to pupils as students. To reflect the terminology used in Mozambique, all labels using 'student' within the model illustration were changed to "pupil." For example, the label "student experience layer" and the "student learning outcomes layer" were changed to the "pupil experience layer" and "pupil learning outcomes" respectively to adjust to the language conventions of Mozambique.
- Teacher characteristics were added due to the variation of these characteristics in the Mozambican context and the belief that their characteristics are essential to explain and understand teacher competence. Outside Mozambique, teacher characteristics are also referred to in the literature as an important variable related to teacher performance. For example, see Murphy (1993). The interaction between teacher characteristics and teacher education leads to teacher competence.
- Teacher training was added because it is an important component for teacher competence.

- ❖ In this model, the external teaching context includes the school, the school library, leadership, parents and community role, all of which are factors which can modify or improve the internal teaching context.
- ❖ The internal teaching context consists of such matters as text books and equipment, as well as the time spent on tasks. Such elements can influence pre-existing pupil characteristics and consequently improve pupils' performance.
- ❖ Parental involvement refers to the role of parents in modifying the internal and external teaching context. The interaction between the teacher, parents and the community is an important aspect as it can result in the modification of the condition of schools and classrooms and, as a result, improve pupils' performance.

This adapted model reflects the belief that teacher competence is part of the overall effectiveness of a teacher in the classroom. The model also displays the interaction between competence and other key components that culminate in teacher effectiveness. Furthermore, it illustrates how the different layers, namely teacher competence, teacher performance, pupil experience and pupil learning outcomes, are related to the cognitive, affective and behavioural domains in the three levels, that is the provincial, national and regional levels. This model is appropriate as the conceptual framework for this study as it reflects most of the variables and concepts that are available in the SACMEQ II database.

Other important information that has an impact on pupil performance such as pre-existing pupil characteristics (gender, age, social status, background), teacher training, the internal teaching context (available classroom furniture, equipment, the time spent on a task), the external teaching context (school facilities, tuition, leadership), and teacher characteristics (sex, age, social status, background) are also included in the model.

Each of the layers in the model will now be described in terms of their content and their relationships with other components of the model.

The Teacher competence layer is the total behavioural, affective and cognitive competence of teachers at provincial, national and regional levels. This layer represents the total static quality of teachers (Cheng and Tsui, 1998). The teachers' level of competency is one of the factors that directly affect the quality of teaching and consequently pupil performance. In order to apply progressive methods of teaching, methods that favour pupil-centred learning based on discovery and consequently on the construction of knowledge by the pupils themselves, teachers are required to have professional training and a level of competence in terms of subject knowledge (Shulman, 1986).

The **Teacher performance layer** is the total performance of a teacher in the three domains at the three levels. It represents the dynamic quality of the teacher in the teaching process. The relationship between two layers can be moderated by the influence of the external teaching context (e.g. organisational factors, leadership and the school environment). Teacher performance is also related to the teachers' professional competence and the level of academic knowledge they have acquired. As stated by Ribeiro (1993, as cited in Passos, Navesse and Chiau, 2000), a high level of academic knowledge is essential for professional teacher training because it is not possible to train good teachers if they do not know the subject matter knowledge that they have to teach. A combination of teachers' high level of academic knowledge and high level of professional training provides the conditions for high teacher performance (Shulman, 1986).

The **Pupil experience layer** represents the total learning experience of pupils in the three domains, namely the cognitive, behavioural and affective at provincial, national and regional levels.

The **Pupil learning outcome layer** represents the pupils' total learning outcomes in the three domains at the three levels. The expected outcomes are determined by relevant real-life needs and are aimed at ensuring an integration of the knowledge, competencies, and orientation needed by pupils to become critical, competent and responsible future citizens.

The **Pre-existing pupil characteristics** (antecedents) are the pupils' experience, gender, age, background, possessions and social status.

The **Internal teaching context** represents the classroom furniture and equipment, the time available for a task, the size of a class, and the textbooks in each classroom.

The **External teaching context** represents the total school resources, the condition of the school, the staff, the nature of the tuition offered, and the role of the parents and the community. The latter is very important, as the parents' role is critical to pupil performance.

Teacher characteristics represent the teachers' age, gender, possessions, background, personal home conditions, knowledge, experience and the approach of a teacher within the three domains at the provincial, national and regional levels.

Teacher training represents the academic and professional training that teachers have acquired in the three domains.

Provincial level teacher effectiveness refers to the overall effectiveness of teachers per province in attempting to achieve objectives in reading and mathematics.

National level teacher effectiveness refers to the effectiveness of a group or team of teachers in attempting to achieve national objectives in reading and mathematics.

Regional level teacher effectiveness refers to the effectiveness of all teachers in the region as a whole in attempting to achieve aims and objectives in reading and mathematics in each SACMEQ country.

This model was chosen on the one hand because the process as a whole could be analysed, and on the other hand because analyses of the variables in each domain could be utilised. In addition, the contents of the SACMEQ reading and mathematics tests are related to the domain classification of the model as defined in Bloom's taxonomy, another component of the conceptual framework which will be discussed in the next subsection. Bloom's classification (1956) of the cognitive domain, in which he includes knowledge, comprehension, application, synthesis, analysis and evaluation, serves a useful function. The research analysis will also give information about the level of pupil difficulties at each skill level (refer to Table 4.4 in Chapter 4) and according to performance as related to overall provincial, national and regional levels.

5.3.1 The Integration of Bloom's Taxonomy

As Cheng and Tsui (1998) do not explicitly define the affective, cognitive and behavioural domains in their model, it is necessary to refer to what a committee of colleagues, led by Bloom, defined as the three domains of educational activity:

The Cognitive domain: mental skills (Knowledge)
The Affective domain: growth in feelings areas (Attitudes)
The Psychomotor domain: manual or physical skills (Skills).

Hauenstein (1998) redefined some of the categories within Bloom's existing domains and added an additional domain, the behavioural domain. However, Gronlund's (2000) adaptation of Bloom's taxonomy is used for the purposes of this study as it is a more refined taxonomy than Hauenstein's (1998) earlier revision. Gronlund's (2000) adaptation has a clear description of the behavioural domain, which is vital for this study. According to Gronlund's (2000) modification of Bloom's Taxonomy, the cognitive, affective and behavioural domains should be described as follows.

The cognitive domain involves mental processes such as knowledge (the recognition and recall of information), comprehension (the interpretation, translation or summarising of given information), application (using information in situations different from the that in which it was learnt), analysis (the separation of wholes into parts, until the relationships among them are clear), synthesis (the combination of elements to form new entities), and evaluation (involving acts of decision making based on a number of criteria or a rationale, or the ability to judge the value of material).

The affective domain has to do with attitudes, opinions, interests, appreciations, values, and emotions (Bloom, Krathwohl and Masia, 1964). Affective learning is about gaining new perceptions (e.g. self-confidence, responsibility, respect, dependability, and sound personal relations). The taxonomy includes receiving (the willingness to receive or attend to particular phenomena or stimuli), responding (as in active participation on the part of the student rather than passive disengagement), valuing (the student sees worth or value in a subject, activity, or assignment), organization (being committed to a set of values as displayed by one's behaviour) and characterizing (total behaviour consistent with internalised values) (Kibler, Cegala, Barker and Miles, 1974).

The **behavioural domain** as defined by Hauenstein (1998, p.3) is a composite of the redefined cognitive, affective and psychomotor domains. The rationale for introducing this new composite domain into the model is that individuals learn as whole persons. The simplified behavioural taxonomy should be useful in classroom and laboratory applications. For example, it could be useful in lesson planning, with levels of behavioural outcomes, the identification of critical information, inputs to achieve outcomes, and the assessment of learning outcomes, as well as in curriculum planning for the development of the individual.

Bloom's taxonomy will be taken into consideration to analyse pupil and teacher performance in terms of the cognitive, affective and behavioural domains. In fact, itemising the factors which make up the quality of a teacher may result in a comprehensive list of essential characteristics, including content knowledge, pedagogical skills, reflection, empathy, managerial competency, commitment, moral conduct, the ability to adjust and improvise, the ability to collaborate with other teachers, and the ability to advance the profession of teaching and to contribute to society at large. Most importantly, the "real" quality of teachers should also be evaluated by their impact on their students.

In general, the quality of the teacher performance layer as a whole has a positive impact on the quality of the student learning experience layer and the latter has a positive relationship with the quality of the student outcomes layer. The relationships may be affected by the characteristics of the internal teaching context (including the student subculture, the classroom climate, the student ability grouping, the learning environment, etc.) and pre-existing student characteristics (such as IQ, family background, etc.)

The next section presents and discusses the research questions of the study.

5.4 RESEARCH QUESTIONS

As stated earlier, the purpose of this study is to describe and explain the relationship between teacher competence and pupil performance in mathematics and reading in upper primary schools in Mozambique and other SACMEQ countries.

The study adopts a quantitative approach which “is one in which the investigator primarily uses postpositivist claims for developing knowledge (i.e. cause and effect thinking, reduction to specific variables and hypotheses and questions, use of measurement and observation, and the test of theories), employs strategies of inquiry such as experiments and surveys, and collects data on predetermined instruments that yield statistical data” (Creswell, 2003, p.18). The research was initiated by collecting data using predetermined instruments and tests that yielded quantitative, statistical data for the SACMEQ study of 2000. The instruments included closed-ended questionnaires for teachers, pupils and principals, as well as tests in reading and mathematics for teachers and their Grade 6 pupils.

5.4.1 The Research Questions

The purpose of this study is to investigate the effect of teacher competence on pupil performance in Mozambican upper primary schools and other SACMEQ countries. Three main questions direct this project. Each of the questions is derived from and related to the variables in the conceptual framework illustrated in Figure 5.1. To answer Question One would mean providing information related to the quality of education in Mozambique in terms of teacher competence and its relationship to pupil performance, where the overall results are described by province and nationwide. Question Two’s results are described by country and region, and Question Three provides information about the main factors influencing education quality in Mozambique and other SACMEQ countries in terms of teacher competence and its relationship to pupil performance:

1. What is the relationship between teacher competence and pupil performance in reading and mathematics in upper primary school in Mozambique?

2. How does the relationship between teacher competence and pupil performance in reading and in mathematics compare across the different Southern Africa Consortium for Monitoring Educational Quality (SACMEQ) countries?
3. What were the main predictors of pupil performance in reading and in mathematics in upper primary in Mozambique and in other SACMEQ countries?

5.4.2 Phase 1 and 2 Research Questions

A number of sub-questions were formulated in initiating the first two phases of the research, answering of which would contribute to arriving at answers to the main research questions. Phase 1 is the descriptive component of the research, which will be addressed in Chapters 6, 7 and 8 below, while Phase 2 is an exploratory analysis, which will be addressed in Chapter 9 (see Appendix 1 for more details).

Phase 1 Descriptive component

These Phase 1 sub-questions are aimed at describing the results of the SACMEQ study and the characteristics of the sample in Mozambique and other countries in terms of context. They assisted in identifying variables to include in the analysis of performance for the first two main research questions. They are:

1. What were the characteristics of the pupils and teachers and schools in Mozambique and in the SACMEQ countries?
2. What were the performances of pupils and teachers in reading and mathematics in Mozambique and in other SACMEQ countries?

To address the first main research question: **What were the characteristics of the pupils and teachers and schools in Mozambique and in the SACMEQ countries?** The related sub-questions need elaboration:

a) *What were the characteristics of the schools that participated in the SACMEQ II study?*

The question is derived from the conceptual framework and is related to the external teaching context. The answer to this question provides information related to school quality in terms of buildings, equipment, the resource centre and the library, and also includes inspection, tuition, and the roles of the parents and the community. The overall results for Mozambique are compared with those of the other SACMEQ countries involved in the study. The results are described by province, nation and region (see Chapter 7, Tables 7.5, 7.6, 7.8, 7.9 and 7.11, and Figures 7.5, 7.6 and 7.7).

b) *What were the characteristics of the classrooms in the schools that participated in the SACMEQ II study?*

This question is directly linked with the internal teaching context in the conceptual framework. The answer to this question provides information related to the classroom background in Mozambique and in other SACMEQ countries in terms of classroom furniture and equipment, the time spent on tasks, class size and textbooks. The overall results are compared with those of the other SACMEQ countries involved in the study. The results are described by province, nation and region (see Chapter 7, Tables 7.1, 7.2, 7.3 and 7.4, and Figures 7.1, 7.2, 7.3, 7.4, 7.5 and 7.6).

c) *What were the characteristics of pupils involved in the SACMEQ II study?*

The question is related to pupil characteristics as seen in the conceptual framework. The answer to this question provides information related to the pupils' background in Mozambique and in other SACMEQ countries, such as pupils' gender, age, possessions and social status. The overall results are compared with those of the other SACMEQ countries involved in the study. The results are described by gender and age, province, nation and region (see Chapter 6, Tables 6.16 and 6.20).

d) *What were the characteristics of the teachers involved in the SACMEQ II study?*

The question is related to teacher characteristics as seen in the conceptual framework. The answer to this question provides information related to the teachers' background in Mozambique, such as teachers' gender, age, possessions, experience, academic level and social status. The overall results are compared with those of the other SACMEQ countries involved in the study. The results are described by gender and age, province, nation and regional (see Chapter 6, Tables 6.1 and 6.4, and Figures 6.1, 6.2, 6.3 and 6.4).

e) *What were the professional profiles of the teachers involved in the SACMEQ II study?*

The question is related to the teachers' training, as seen in the conceptual framework. The answer to this question provides information related to the teachers' professional profile in Mozambique. The overall results are compared with those of the other SACMEQ countries involved in the study. The results are described by gender and age, province, nation and region (see Chapter 6, Tables 6.4

and 6.11). This information is a foundation for the understanding and interpretation of the results described in Chapters 8 and 9.

The second question is **"What were the performances of pupils and teacher in Mozambique and in SACMEQ countries?"** To address this, specific questions informed by the conceptual framework were formulated as follows:

f) *How did teachers perform in the mathematics and reading tests in Mozambique and in the other SACMEQ countries?*

The question is related to teacher performance, as seen in the conceptual framework. The answer provides information about the performance of teachers in the SACMEQ tests in Mozambique and in the other countries participating in the study. The overall results are compared with those of the other SACMEQ countries involved in the study. The results are described by gender, socio-economic status and school location by nation and regional (see Chapter 8, Figures 8.1, 8.2, 8.17 and 8.18).

g) *How did pupils perform in the mathematics and reading tests in Mozambique and in other SACMEQ countries?*

The question is related to the pupils' learning outcomes as seen in the conceptual framework. The answer provides information related to the pupils' performance in the SACMEQ tests in Mozambique and in the other countries participating in the study. The overall results are compared with those of the other SACMEQ countries involved in the study**.** The results are described by gender and age, province, nation and region (see Chapter 8, Figures 8.3 to 8.16 and Figures 8.19 to 8.32).

The relationship between teacher competence and pupil performance is explored in Phase 2.

Phase 2 – Exploratory analysis

One of the issues to be explored in the second phase is the relationship between teachers' professional training and pupils' performance in reading and in mathematics. An analysis was undertaken to see whether or not there is a significant difference in pupil performance between pupils with trained or untrained teacher. The analysis was also concerned with the interrelationship between pupil performance and other factors. As previously stated, the second phase is the exploratory part of the study, the purpose of which is to address the central research question, namely: What is the effect of teacher competence on pupil performance in reading and in mathematics in upper primary school in Mozambique and in other SACMEQ countries? This question was ramified as follows:

What is the relationship between teacher competence and pupil performance in reading and in mathematics in upper primary school in Mozambique?

Specific questions are:

1. *How did pupils perform in reading in upper primary schools in Mozambique?*
2. *How did pupils perform in mathematics in upper primary schools in Mozambique?*

How does the relationship between teacher competence and pupil performance in mathematics and reading compare across the different SACMEQ countries?

Specific questions are:

3. *How did pupils perform in reading in upper primary schools in SACMEQ countries?*
4. *How did pupils perform in mathematics in upper primary schools in SACMEQ countries?*

To address these questions an exploratory analysis of variables at different levels was conducted using correlation and multivariate regression. The aim of the exploration was to identify the relationship between teacher competence and pupil performance as well as the main predictors of pupil performance in reading and mathematics.

Research Question 3 provides information about the main predictors influencing education quality in Mozambique and other SACMEQ countries in terms of teacher competence and its effects on pupil performance (see Chapter 9 Tables 9.1 to 9.21).

To what extent does teacher competence predict pupil performance in reading and in mathematics in upper primary schools in Mozambique and in other SACMEQ countries?

To address critical question number 3, specific questions were formulated as follows:

a) *What were the main predictors of pupil performance in reading in Mozambique?*
b) *What were the main predictors of pupil performance in mathematics in Mozambique?*

c) *What were the main predictors of pupil performance in reading in SACMEQ countries?*
d) *What were the main predictors of pupil performance in mathematics in SACMEQ countries?*

The questions are derived from the conceptual framework and are related to the main predictors of pupil performance in reading and mathematics in Mozambique and in other SACMEQ countries.

The answers to these questions provide information related to the factors that have the strongest influence on pupil performance in Mozambique and in other SACMEQ countries. The overall results of Mozambique are compared with those of the other SACMEQ countries involved in the study. The results are described nationwide and regionally (see Chapter 9 Tables 9.22 to 9.29).

The aim of the exploration was an attempt to ascertain which of the variables in the conceptual framework has the strongest influence on pupil performance in reading and in mathematics in Mozambique and in other SACMEQ countries. Evidence from previous research suggests that there is a relationship between teacher competence and pupil performance, as confirmed by Sander and Horn (1998) when they emphasized the linkage between teacher competence and student achievement. For Châu (1996), the teacher's level of competence is one of the factors that directly affect the quality of teaching. Some researchers, such as Steyn (1999) and Dimmock (1990) confirm the important role of teacher competence in determining the quality of pupil performances. According to Botha and Hite (2000), a competent teacher will focus, with his learners, on particular predetermined results or outcomes (see Chapter 3). However, it should be stressed that pupil performance is determined by other factors such as the pupils' background, school conditions and home language, just to mention a few. Therefore, the variables related to pupil performance will be explored to determine whether, and if so, how they affect pupil performance. The study is highly descriptive and exploratory and an analysis will be performed to establish the extent of the relationship between teacher competence and pupil performance. This aspect is discussed in Chapter 9 on the basis of the results of correlation and Multi Regression Model.

5.5 SOME DESIGN ISSUES

The sample, the instruments, the procedures and the analysis plan used for this study are presented and discussed in this section. General information related to the SACMEQ design has already been given in Chapter 4.

5.5.1 Design Origins

The research design for the SACMEQ study was standardised across all participating countries. The design itself is discussed in detail by Ross, Saito, Dolata, Ikeda and Zuze (2004). However, for convenience's sake the design is outlined in this section too, to assist the reader in understanding the research process that was initiated for the SACMEQ II study. The data from the SACMEQ II study is used for further analysis in this thesis.

5.5.2 Reasons for Sample Focus

The SACMEQ I and II projects focused on the Grade 6 level for three main reasons, these being:

i. Grade 6 was identified as a point near the end of primary schooling where school participation rates were reasonably high for most of the seven countries. For this reason, Grade 6 represented a point that was suitable for assessing the contribution of primary schooling towards the literacy and numeracy levels of a broad cross-section of society.

ii. The National Co-ordinators (NRCs) considered that testing pupils at grade levels lower than Grade 6 was problematic because in some SACMEQ countries the lower grades were too close to the transition point between the use of local and national languages by teachers in the classroom. This transition point generally occurred at around Grade 3 level but in some rural areas of some countries, it was thought to be as high as Grade 4 level.

iii. The NRCs were of the opinion that the collection of home background information from pupils at grade levels lower than Grade 6 was likely to lack validity for specific key "explanatory" variables. For example, the NRCs felt that children at lower grade levels would not know how many years of education their parents had received, and they would also have difficulty in accurately describing the socio-economic environment of their own homes (for example, the number of books at home) (Ross, Saito, Dolata, Ikeda and Zuze, 2004, p.21).

5.5.3 Desired, Excluded and Defined Target Populations

The desired target population definition for the SACMEQ II Project was as follows:

All pupils at Grade 6 level in 2000 (at the first week of the eighth month of the school year) who were attending registered mainstream primary school (Ross, Saito, Dolata, Ikeda and Zuze, 2004, p.21).

The use of the word "mainstream" in the definition of the desired target population automatically indicated that special schools for those with disabilities should be excluded from the SACMEQ II data collection. In addition, a decision was taken to exclude small schools, that is, schools having fewer than either 15 or 20 pupils in the desired target population. Small schools were excluded because it was known that they represented a very small component of the total population of pupils. These schools were also known to be mostly located in very isolated areas that were associated with high data collections costs, and it was determined that these schools could be excluded without leading to major distortions in the study population (Ross, Saito, Dolata, Ikeda and Zuze, 2004).

5.5.4 The Numbers of Schools and Pupils required for the SACMEQ II Study

The SACMEQ II study used the same instruments, common definitions of target populations, and standardised procedures in order to measure student achievement in each of the participating countries. As stated in Chapter 3, the number of schools required in the sample is in part a function of the intra-class correlation (rho). The values of rho for educational achievement measures are usually higher for education systems where pupils are allocated differentially to schools based on performance, either administratively through some form of "streaming", or structurally through socio-economic differentiation among school catchment zones. In general terms, a relatively large value of rho means that, for a fixed total number of sample members (pupils in this study), a larger number of primary sampling units (schools in this study) needs to be selected in order to obtain the same sampling precision as would be obtained for a relatively lower value of rho. That is, higher values of rho normally require larger numbers of schools to be selected into the sample (Ross, Saito, Dolata, Ikeda and Zuze, 2004, p.26).

The following is the formula often used for estimating the value of rho in situations where two-stage cluster sampling is employed using approximately equal-sized clusters.

$$\text{estimated rho} = (b.\ s(a)^2 - s^2) / (b - 1)s^2$$

where $s(a)^2$ is the variance of cluster means, s^2 is the variance of the element values, and b is the cluster size.

Following a consideration of the results of the SACMEQ I project, it was decided to use rho values in the range of 0.3 to 0.4 as an estimate of the value of the coefficient of intra-class correlation for most of the countries involved in the SACMEQ II Project. An exception was made for Namibia, where calculations based on SACMEQ I data indicated that a value of rho = 0.6 should be used (Ross, Saito, Dolata, Ikeda and Zuze, 2004, p.27).

Using values of rho=0.3 (Botswana, Malawi, Mauritius, Swaziland, Uganda) and rho=0.4 (Kenya, Lesotho, Mozambique, South Africa, Tanzania, Zambia) in association with a minimum cluster size of 20 pupils indicated that there was a need to select (at least) 134 and 172 schools for these two groups of countries respectively, in order to meet the SACMEQ II project sampling requirements. In fact, additional schools were selected in most countries with the aim of achieving reasonably stable sample estimates within regions.

Exceptions to this approach were made for Namibia, the Seychelles and Zanzibar. In Namibia, where value of rho = 0.6 applied at least 248 schools were required in Namibia. In the Seychelles and Zanzibar it was decided to include all schools in the defined target population (Ross, Saito, Dolata, Ikeda and Zuze, 2004, p.28).

5.5.5 Sample

Table 5.1 below presents the number of schools and pupils in the desired, defined, excluded, planned and achieved populations in each country for the SACMEQ II project. The table also presents the net enrolment as well as the gross enrolment in each country.

The numbers of schools involved in the data collection for each school system ranged from 24 in the Seychelles (where the whole target population of schools and Grade 6 pupils was involved), to 275 in Namibia (where the known magnitude of the coefficient of intra-class correlation and the requirement to gather data in “new” administrative regions added substantially to the required number of schools). The average number of schools per country for the designed samples was around 165.

As can be seen in Table 5.1, of the fourteen countries involved, six reached the planned number of schools, namely Botswana, Kenya, Malawi, Mauritius, Namibia and the Seychelles. South Africa realised the lowest proportion of the planned sample schools, delivering on only 169 schools instead of the 185 schools planned for (91% of the intended sample). The delivery in the other countries ranged from 99% in Swaziland, Uganda and Zambia to 96% in Zanzibar.

Table 5.1

Sampling in the SACMEQ countries

Coun-tries	Net/Gross E.R. 2000		Desired, Defined and Excluded Populations							Planned and Achieved Samples					
			Desired		Defined		Excluded			Schools			Pupils		
										Plan-Ned	Achieved		Planned	Achieved	
	NER	**GER**	**Schools**	**Pupils**	**Schools**	**Pupils**	**Schools**	**Pupils**	**Pupil %**		No	%		No	%
BOT	87.6*	117.9*	720	41 408	589	39 773	131	1 635	3.9	170	170	100	3 400	3 322	98
KEN	86.5	96.3	15 439	631 544	13 313	607 900	2 126	23 644	3.7	185	185	100	3 700	3 299	89
LES	83.0*	91.8*	1 170	40 493	947	39 212	223	1 281	3.2	180	177	98	3 600	3 155	88
MAL	91.6*	109.9*	3 663	219 945	3 368	212 046	295	7 899	3.6	140	140	100	2 800	2 333	83
MAU	97.0	104.0	277	26 510	274	26 481	3	29	0.1	159	159	100	3 180	2 945	93
MOZ	54.7	92.1	509	112 279	500	112 173	9	106	0.1	180	176	98	3 600	3 177	88
NAM	91.3	119.4	849	48 567	767	47 683	82	884	1.8	275	275	100	5 500	5 048	92
SEY	100	101.0	25	1 577	24	1 571	1	6	0.4	24	24	100	1 546	1 484	96
SOU	97.0	99.0	17 073	962 350	11 997	920 020	5 076	42 330	4.4	185	169	91	3 700	3 163	85
SWA	76.1*	100.5*	498	19 940	458	19 541	40	399	2.0	170	168	99	3 400	3 139	92
TAN	58.8	77.6	10 786	529 296	9 516	511 354	1 270	17 942	3.4	185	181	98	3 700	2 854	77
UGA	110.7	128.3	9 688	517 861	8 425	499 127	1 263	18 734	3.6	164	163	99	3 280	2 642	81
ZAM	65.6	77.9	3 858	180 584	3 090	176 336	768	4 248	2.4	175	173	99	3 500	2 611	75
ZAN	71.0	92.2	161	22 179	151	22 041	10	138	0.6	151	145	96	3 020	2 514	83
TOT	**-**	**-**	**64 716**	**3 354 533**	**53 419**	**3 235 258**	**11 297**	**119 275**	**3.6**	**2 343**	**2 305**	**98**	**47 92 6**	**41 686**	**87**

Source: Data from SACMEQ database, 2004.

(*) The figures were estimated by the NRCs from raw data.

Legend: TOT= Total; NER=Net Enrolment Ratios; GER=Gross Enrolment Ratios
Enrolment in EP1 - is the proportion between the total number of pupils schooling at EP1 and the official age group supposed to be schooling at EP1 (age group of 6-10) (MEC, DP, 2005, p.5)
Net Enrolment in EP1 – is the proportion between the pupils schooling at EP1 with the official age for that level (6-10 years) and the population in that age group) (MEC, DP, 2005, p.5).
Desired Target Population The desired target population definition for the SACMEQ II Project was exactly the same (except for the year) as was employed for the SACMEQ I Project. This consistency was maintained in order to be able to make valid cross-national and cross-time estimates of "change" in the conditions of schooling and the quality of education.
Excluded and Defined Target Populations The use of the word "mainstream" in the definition of the desired target population automatically indicated that special schools for the handicapped should be excluded from the SACMEQ II data collection (Ross, Saito, Dolata, Ikeda and Zuze, SACMEQ database, 2004,pp.21 & 24).

No countries reached the planned sample of pupils. Botswana had the highest percentage of pupil that participated in the test (98%) and Zambia had the lowest percentage of pupils that took part in the tests. Of the 180 schools planned for, Mozambique reached 168, giving a total of 3 177 pupils of the 3 600 intended. Because of an rho of 0.6, Namibia had the highest number of schools (275 planned and achieved) and pupils (5 500 planned and 5 048 achieved) involved in the study. In all of the SACMEQ countries taken together, out of the 2 343 schools planned for, 2 305 were reached (98%), and of the 47 926 pupils anticipated, 41 686 (87%) were reached.

5.5.6 Instruments

The information to be used in this study comprises school head questionnaires, teacher and pupil questionnaires and information related to teacher and pupil performance in the SACMEQ II tests in mathematics and in reading (see Appendix 2 for more details). As stated before, all of the countries used the same instruments for the SACMEQ study and followed the same methodology for data collection. In addition to the description in Chapter 3 of the instruments used in the SACMEQ II study, it is necessary to note that because of the language of instruction in Tanzania and Zanzibar, these pupil instruments were translated into Swahili. In Mozambique, where Portuguese is the official language and the language of instruction from Grade One, all of the instruments were translated into Portuguese. All of the instruments were administered in English in the rest of the countries.

5.5.7 Procedures

According to Ross, Saito, Dolata, Ikeda and Zuze (2004), the main SACMEQ II data collection occurred for twelve of the fifteen SACMEQ Ministries of Education in the period September to December 2000. The Mauritian data collection was completed in July 2001, and the Malawian data collection in September 2002.

The Rasch scaling could be conducted only after all countries' data files had been cleaned. Some countries took a long time with this cleaning process, and it was only in May 2003 that the final country's data file was ready and the scaling and scoring could begin. Once this had been completed, then the calculations required for the dummy tables could be undertaken. This tabling was produced by the Paris "Monitoring Educational Quality" team, and the dummy tables were sent out to all SACMEQ countries (Ross, Saito, Dolata, Ikeda and Zuze, 2004).

Data Analysis

The analysis of the data is descriptive in the first phase of the research, and forms the background to the understanding and interpreting of the second phase, in which an explorative analysis of variables at different levels was conducted. The aim of the exploration is to identify the relationship between teacher competence and pupil performance in reading and mathematics using correlation analysis and a multiple regression model.

The descriptive analysis[12] focused on using measures of central tendency (means, percentages) and variation (standard errors) to describe pupil and teacher performance in the SACMEQ reading and mathematics tests, as well as the condition of the schools and the pupils' and teachers' measurable characteristics. The second phase comprises two stages, the first of which was an inferential analysis in which statistics were generated using the t-test and F-test to analyse variations in pupil performance in relation to factors such as gender and school location. This stage also includes bivariate correlations and partial correlation analysis such as correlations between pupil performance and teacher profile and the condition of the schools. The focus of the second stage was the multivariate statistical analyses, specifically multiple regression analysis and principal component analysis (PCA). Multiple regressions of the teacher profile (teacher knowledge, professional training, academic level and teacher experience) and school conditions as factors influencing pupil performance were conducted. The analyses were performed at national and regional level. Some of the variables were reduced using PCA. Each of the techniques used in the third part of the analysis are elaborated in the following Sections, as also the rationale for using them.

Analysis Plan

The analysis of the data was structured as follows:

Weighted data was used in order to compare the results from different countries for this study (see phase 11 in chapter 4 section 4.2.2). The first step was an exploratory analysis using basic statistics to summarize and describe the pupil and teacher performance, the condition of the schools, and the socio-demographic characteristics of the SACMEQ countries. This information highlights the context in which the study was conducted and it also forms the background for supporting and understanding the results in Chapter 9.

Principal components analysis (PCA) was then used to group the number of items into constructs which could then be directly related to each domain according to the Cheng and Tsui model[13].

[12] This thesis is a secondary study. The problem of missing data could therefore not be addressed.
[13] There was a need to aggregate the variables at school level as the pupils and teachers belong to schools.

Apart from using principal component analysis as a method to explore construct-related validity, the reliability of a measure would also speak to the validity of inferences being made. In this regard, internal consistency reliability is used namely Cronbach alpha. In addition by undertaking reliability analysis the level of measurement error can also be estimated. Values of Cronbach coefficient greater that 0.8 is an indication of good reliability (Kline, 2003)

Next, an exploratory analysis of the correlations between the indicators in each domain and pupil performance was performed, to have a first indication of the variables that are most likely to be predictors of pupil performance. Finally, a stepwise regression analysis was used to explore to what extent the data fits the Cheng and Tsui model.

The analysis started with univariate statistics of all important variables linked with the research questions (see Appendix 3 for more information). An exploratory principal component analysis was used in the next stage. Scale analysis and a reliability coefficient were used to develop valid constructs described in the conceptual framework, which are the constructs that capture the three domains defined by Cheng and Tsui (1998), namely the cognitive, affective and behavioural domains. For each domain, a construct was developed for pupils and teachers. Other constructs were included, in addition to the Cheng and Tsui (1998) domains and levels, such as pupil characteristics, the internal teaching context, the external teaching context, teachers' characteristics, teacher training, and parental and community involvement.

Before undertaking Multivariate regression the descriptive statistics were analysed as was described in Chapters 6 and 7. Furthermore, correlation analyses was undertaken to ascertain which relationships (see Chapter 9) should be explored in the regression analyses.

A stepwise multivariate regression model was used to analyse the variation in pupil performance indicated by the predictors. These results made it possible to understand the extent to which the data and the relationships are explained by the conceptual framework. The variables and the descriptive statistics (described in Chapters 6 and 7) include a correlation matrix (reported in Chapter 9) to provide initial relationships for further analysis of the effect of teacher competence on pupil performance. [14].

[14] There was a need to aggregate the variables at school level as the pupils and teachers belong to schools.

Multiple Regression

The Multiple regression model is one of the recommended approach to see to what extent the Cheng and Tsui model fit the data. In this approach the research population consisted of schools and pupils within the schools. The sampling procedure took place in two stages. Firstly, a sample of schools was drawn and subsequently a sample of pupils within each school was drawn. For instance, pupils in the same schools tend to be similar to one another, because of the selection process in the area that feeds the school. Some schools may attract pupils from a higher socio-economic status (SES) while others attract more pupils from a lower socio-economic status. As a result, the average correlation (the inter-class correlation) between variables measured on pupils from the same schools may be higher than the average correlation between variables measured on pupils from different schools. Raudenbush and Willms (1995) have used the statistical model to analyse the school effect, "where the outcome variable (Y) as arising from the influence of school practice (P), school context (C), student background (S), and random error (e) according to the additive model

$$Y_{ij} = \mu + P_{ij} + C_{ij} + S_{ij} + e_{ij}$$

where Y_{ij} = the outcome for student *i* in school j; μ = the grand mean of Y; P_{ij} = the effect of school practice (including, for example, school resources, organizational structure, and instructional leadership) on student*i* in school j; C_{ij} = the contribution of school context (including, for example, the mean socioeconomic level of the school's pupils/student and the unemployment rate of the community) (Raffe and Willms, 1989, as cited in Raudenbush and Willms, 1995, p.313); S_{ij} = the influence of the measured pupil background variables (including, for example, pre-entry aptitude or socioeconomic status); and e_{ij} = a random unmeasurable sources of a particular student's/pupil outcome, assumed statistically independent of P, C, and S with zero mean and a homogeneous variance σ^2 (e)" (Raudenbush and Willms, 1995, p.313).

The Ordinary Least Squares (OLS) regression model had to be used at school level owing to the existence of various constraints, but bearing in mind its limitations. This model indicated the extent to which pupil performance at school level could be explained by the construct of the Tsui and Cheng (1998) model[15]. According to Woodhouse and Goldstein (1988), the Ordinary Least Squares Regression has a widely-known limitation giving rise to its inability to cope with the hierarchical nature of school and pupil-based data. In the OLS model, the hierarchical nature of the data is generally ignored and it is assumed that individual pupils' outcomes within a school are independent of each other. Because of this weakness, it is argued that OLS regression can lead to an inaccurate and poorly estimated model (Shuttleworth, 1995, p.494).

[15] The inter-class correlation is high in some countries, implying that variation between schools is stronger than that within schools.

The school-level regression model is used in this research. The equation for the regression model is presented below. The response variable, Y, and q predictor variables, x_1, x_2, ,x_q are expressed in a linear model:

$$Y_i=\beta_o+\sum\beta_{ij}x_{ij}+e_{ij}$$

where Y_i is the school average and x_i is the indicator of each domain or construct j, namely the cognitive, affective and behavioural domains, and constructs such as teacher training, teachers' characteristics, the internal teaching context, the external teaching context, pupils' characteristics, and parent and community involvement. In some cases, the indicator is a result of the principal component analysis. β_i is the estimated partial regression coefficient, which measures the magnitude effects of the indicator on pupil performance at school level, and x_i represents the predictor within each domain or construct in the conceptual framework.

The following assumptions were made (as referred to by Mendenhall and Sincich, 1996):

Assumption one: the variance of the probability distribution of ε is constant for all settings of the independent variable x.

Assumption two: the probability distribution of ε is normal. Tests of normality will be used to check this assumption.

Assumption three: the errors associated with any two different observations are independent. That is, the error associated with one value of y has no effect on the error associated with other y values was used to check this assumption.

According to Mendenhall and Sincich (1996), multiple regression analysis is recognized by the practitioners as a powerful tool for modelling a response y, and is widely used. However, there are a number of pitfalls which had to be considered in this study, as follows.

Multicollinearity issues arise due to the fact that the indicators are correlated in many cases. One of the consequences of multicollinearity is a higher r^2 with few independent variables being significant. This artefact is likely to occur in the case of this research due to the fact that most predictors are correlated. Mendenhall and Sincich (1996) discussed ways of detecting multicollinearity. The estimation of the Variation Inflaction Factor (VIF) is one of the methods used to measure the level of multicollinearity. The quantity $(1/ (1-R^2_i))$ is called the variance inflation for the parameter β_1, denoted $(VIF)_1$ (Mendenhall and Sincich, 1996, p.356). A large R^2 means that the independent variables x_i are strongly related to the other independent variables. A high VIF (more than 10) VIF means that the variables are strongly correlated. In this research, a VIF of less than 10 will be used as a criterion to select predictors.

Heteroscedasticity *y*: at each level of the predictor variable(s), the variance of the residual terms should be constant. This means that the residuals at each level of the predictor(s) should have the same variance (homoscedasticity). When the variances are unequal this is referred to as heteroscedasticity, a condition which has consequences for the robustness of the model. In the presence of a higher level of heteroscedasticity the t-test and f-test might be questionable. Heteroscedasticity will be detected in this study through the examination of patterns of residual plots. The pattern of residual plots often suggests the appropriate variance-stabilizing transformation[16] to use. A correlation between the predictors and the residual was also used to explore heteroscedasticity.

Principal Component Analysis

Principal component analysis (PCA) identifies common components (or factors) underlying a set of items in survey data. It can be used to analyse interrelationships among a large number of variables and explain these variables in terms of their underlying factors. With this approach, the information contained in the original variables is condensed into a smaller set of constructs (Smith, 2002). This small number of constructs was estimated (as exploratory variables) using a multi regression model (MRM).

Some of the domains comprised more than 20 indicators, for example the external teaching context, which had 25 indicators. PCA was applied to group the indicators into a reduced number of variables. Those constructs or components were used as explanatory variables in a regression model to analyse the extent to which the various dimensions predicted the pupil performance.

Criteria for the selection of the predictors for Multiple Regressions Model (MRM)

Various steps were taken to select the predictors for inclusion in the MRM. The first was the analysis of the bivariate correlation between pupil performance and the various indicators in each domain. Correlation coefficient with an absolute value equal to or higher than 0.15 with achievement (reading and mathematics), was taken as the cut-off point for inclusion in the MRM. The variables related to teacher qualifications were also included. For the second step, MRM was run by using the predictors selected in the first step. The analysis of the results shows that some of

[16] Logarithmic transformation is one way of stabilising the variance.

the predictors that were supposed to explain pupil performance did not show a significant regression coefficient. The existence of multicollinearity is one of the possible reasons for not getting a significant partial regression coefficient. Stepwise regression was therefore used to address this problem in order to identify the most important predictors of pupil performance in Mozambique and in the SACMEQ countries. The most commonly used stepwise regression procedure available in most popular statistical software packages works as follows: The user first identifies the response, y, and then the set of potentially important independent variables, x_1, $x_{2\ldots}x_{n,}$ where **n** is generally large. The stepwise procedure essentially uses a forward selection procedure during analysis. Thus, at each point during the analysis the variable with a highest correlation is added to the model. The first variable is added based solely on the highest correlation while the variables added thereafter is added based on the highest correlation after *Y* has been adjusted for based on the effect of the first variable added. It is also important to note that it is possible for variables included in initial stages of the regression to be deleted in later stages, as different levels of significance are assumed for the inclusion and exclusion of variables (Chatterjee and Hadi, 2006).

5.6 SUMMARY

The conceptual framework for this study was adopted and adapted from Cheng and Tsui’s model (1998), which was adapted from Medley (1982). The adaptations to Cheng and Tsui’s model were necessary to reflect language usage in the relevant countries and to reflect the practices in schools. The research questions, as related to the conceptual framework and in terms of their functions, were outlined in detail.

The study involves all participating SACMEQ countries. Some countries attained the intended sample of schools, but none achieved the intended sample of pupils. Mozambique, Tanzania and Zanzibar translated the instruments into Portuguese and Swahili respectively.

The analysis of the information is descriptive initially, and this is followed by an explorative analysis of variables at different levels. The aim of the exploration is to identify the relationship between teacher competence and pupil performance in reading and mathematics using correlation analysis and MRM.

The next chapter describes the conditions of the schools, and pupils’ and teachers’ characteristics in Mozambique and in other SACMEQ countries. Chapter 6 also provides information related to the level of teachers’ professional and personal satisfaction.

CHAPTER 6

TEACHER AND PUPIL CHARACTERISTICS IN MOZAMBIQUE AND IN OTHER SACMEQ COUNTRIES

INTRODUCTION

The aim of this chapter is to describe the characteristics in terms of gender, age, social status, academic education, professional training and professional experience reported by teachers at the Grade 6 level in primary schools in Mozambique and SACMEQ countries, as well as of their pupils, and the problems that they encounter. This information is presented firstly, to provide a context for the subsequent analysis and interpretation of teacher and pupil performance discussed in Chapter 8, and secondly, so that teacher characteristics can be related to a teacher and pupil performance. In addition, the results presented in this chapter are largely based on the Mozambican report (see Passos, Nahara, Magaia and Lauchande, 2005) and use data from the SACMEQ database archive (2004). These results serve as background information for the analysis in Chapters 8 and 9.

The information presented in Section 6.1 describes teacher characteristics, namely sex, age and socio-economic status, in Mozambique and SACMEQ countries. In addition, job satisfaction, teachers' qualifications and experience as well as professional training and experience are presented. In Section 6.2, pupil characteristics, such as age and sex, is discussed, as well as the problems they encounter with their socio-economic status in Mozambique and other SACMEQ countries. Section 6.3 draws this discussion to a conclusion.

6.1 TEACHERS' CHARACTERISTICS IN MOZAMBIQUE AND IN SACMEQ COUNTRIES

Mozambican and regional teacher characteristics are presented and discussed in the next section in order to provide a background to this study and in order to address the research questions.

6.1.1 Teacher Characteristics in Mozambique

The quality of teacher training is one of the controversial issues under discussion among the stakeholders in the Ministry of Education and Culture. Mozambique has had, since 1975, many models of teacher training curricula, but until 2008, the Ministry of Education and Culture has not had an ideal model for teacher training. As a result, the poor levels of effectiveness of the education system may, in some way, be explained by the lack of a coherent teacher training policy.

Teacher Education is provided at the Lower Primary School Teacher Training Colleges (CFPP), and Primary School Teacher Training Institutes (IMP before 1992 and IMAP since 1992). The entry qualification for lower primary school teacher training colleges is Grade 7 and the teachers are trained for three years, enabling them to teach in lower primary schools from Grades 1 to 5. The entry qualification for primary school teacher training institutes is Grade 10 and the teachers are trained to teach in both lower and upper primary schools**.** The duration of this course is two years.

Sex, age and socio-economic status of teachers in Mozambique

To assist in developing a picture of teachers in Mozambique, characteristics such as sex, age and their socio- economic status (SES) is discussed. The means, percentages, and sampling errors for age, gender, and socio-economic background of reading and mathematics teachers across the 11 provinces in Mozambique, are presented in Table 6.1. To facilitate readability, these figures are rounded off when referred to in the text.

Table 6.1

Mean, percentages, and sampling errors for age, gender, and socio-economic status of reading and mathematics teachers

Region	Reading teachers						Mathematics teachers					
	Age (years)		Gender (female)		Possessions at home (index)		Age (years)		Gender (female)		Possessions at home (index)	
	Mean	SE	%	SE	Mean	SE	Mean	SE	%	SE	Mean	SE
Cabo Delgado	35.7	1.05	9.4	9.46	3.0	0.42	32.3	1.02	0.0	0.00	3.2	0.24
Gaza	33.1	1.84	44.5	13.45	3.9	0.65	28.8	1.90	32.1	12.36	3.2	0.30
Inhambane	29.2	2.18	27.8	11.03	3.2	0.56	30.0	2.22	23.5	10.71	4.6	0.42
Maputo Cidade	33.8	0.99	46.1	8.85	4.1	0.32	33.1	0.78	45.7	9.02	4.6	0.54
Manica	35.2	2.22	23.8	9.58	4.7	0.49	32.4	1.61	15.9	6.95	4.3	0.41
Maputo Província	31.5	1.17	20.8	8.38	5.3	0.50	30.5	1.24	42.6	11.01	4.1	0.51
Nampula	34.4	1.92	15.7	5.23	3.7	0.31	31.0	1.33	8.7	3.68	2.7	0.32
Niassa	28.2	0.87	9.2	6.25	3.4	0.30	29.9	0.53	0.0	0.00	3.3	0.35
Sofala	35.3	1.49	50.1	8.90	4.4	0.39	33.1	0.87	39.4	7.73	5.1	0.41
Tete	32.1	1.57	34.4	11.07	4.1	0.36	31.5	1.58	21.6	8.59	3.4	0.41
Zambézia	32.0	1.31	14.7	8.36	3.9	0.29	30.1	0.94	12.6	5.42	3.5	0.33
Mozambique	**32.7**		**29.9**		**3.9**		**31.1**		**26.0**		**3.8**	**0.15**

Source: SACMEQ database, 2004

Maputo Cidade, one of the provinces and the capital of the country, has a high level of social and economic development compared with the other provinces. Socio-economic status is one of the variables that may have a positive impact on teacher and pupil performance. This issue is taken into consideration in the analysis of the results across provinces.

Focusing on Grade 6 reading and mathematics teachers in Mozambican schools, the SACMEQ study found that the teachers of reading were on average almost 33 years old compared to mathematics teachers, who were 31 years of age. The ages ranged from 28 years old in Niassa to 36 years old in Cabo Delgado for reading teachers, and, from 29 years in Gaza to 33 years in Maputo Cidade and Sofala for mathematics teachers.

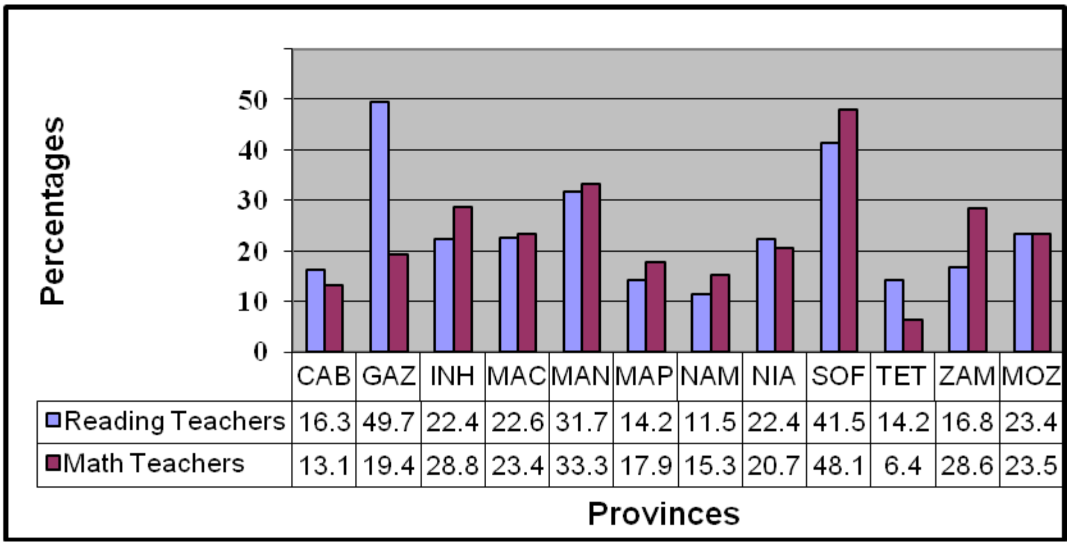
Just less than one third (30%) of Grade 6 pupils were taught reading by female teachers, and this percentage ranged from 50% of reading teachers in Sofala to a mere 9% in Niassa being female. In contrast, a quarter of the pupils were taught mathematics by teachers who were female. Across the provinces, this percentage varies immensely, from 46% in Maputo Cidade to 0% in Niassa and

Cabo Delgado, where the mathematics teachers were predominantly male. It is anticipated that the implementation of the MEC Strategy Plan (1998), which identified areas of concern, will over the years reduce the gender imbalance between provinces and presumably also over the entire country.

In SACMEQ II, several items have been selected to measure the social and economic status (SES) of teachers in Mozambique. These items include the personal possessions of the teachers at home, such as the daily newspaper, a weekly or monthly magazine, a radio, a TV set, a video cassette recorder (VCR), a cassette player, a telephone, a refrigerator/freezer, a car, a motorcycle, a bicycle, piped water, electricity (mains, generator, solar), a table to write on, and livestock. Possessions are one of the indicators of social status because they provide information about living conditions and, consequently, the quality of life.

An index for socio-economic status (SES) was compiled to provide a score for the combined items (listed above). The minimum score is 0 if a teacher does not have any items in the list, and the maximum is 13, if a teacher has all of items in the list. The average number of possessions for reading teachers was 3.9, and for mathematics teachers it was 3.8. These low means indicates a low SES among these teachers. The poorest reading teachers were found in Cabo Delgado (3) and the richest (5.3) in Maputo Província, and the mathematics teachers ranged from the poorest (2.7) in Nampula to the richest (5.1) in Sofala.

Housing, an indicator of socio-economic status, is an important factor to take into consideration in terms of job satisfaction. Teachers usually build cheaper houses made of mud with roofs that are thatched with grasses. Figure 6.1 shows the percentage of teachers who felt that their housing was in an acceptable condition, from which one could conclude that they are comfortable with their current living conditions (see Appendix 6 for more details).

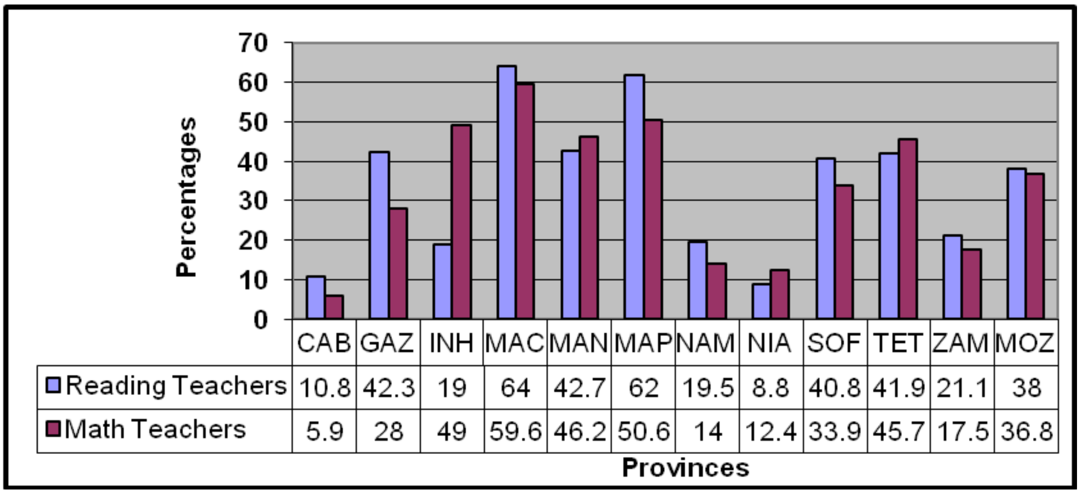


Source: Data from SACMEQ database, 2004

Figure 6.1 Percentages of teachers whose housing is perceived to be in an acceptable condition

Just under a quarter (only 24%) of Grade 6 pupils were taught by reading and mathematics teachers who indicated that their living conditions were acceptable. Some provinces revealed large differences between reading and mathematics teachers, the largest difference being seen in Gaza with 50% amongst their reading teachers and 19% amongst their mathematics teachers being satisfied with their living conditions.

A further indicator of socio-economic status is the type of lighting that the teacher has access to at home. Figure 6.2 shows the percentage of teachers who had electricity installed in their homes (see Appendix 7 for more details).



Source: Data from SACMEQ database, 2004

Figure 6.2 Percentage of teachers that had electricity at home

In Mozambique, the majority of mathematics and reading teachers in upper primary schools do not have electricity at home. An average of just over a third of both mathematics teachers (37%) and reading teachers (38%) have electricity in their homes. This percentage varied enormously in the provinces, ranging from a low 6% in Cabo Delgado to 60% in Maputo Cidade for mathematics teachers and from 9% in Niassa to 64% in Maputo Cidade for reading teachers. The more northern provinces tend not to have been supplied with electricity in contrast to the Maputo Cidade which is more economically developed with a better infrastructure.

Job satisfaction in Mozambique

Various conditions should be favourable in order for teachers to do their jobs adequately. To ascertain whether teachers were satisfied with their present conditions of teaching, teachers were asked to respond to 16 possible reasons for job satisfaction. Table 6.2 shows the percentage and sampling error for teachers' rating of elements for job satisfaction.

Table 6.2

Percentages and sampling errors for teacher ratings of reasons for job satisfaction in Mozambique

Reason given	**Reading teachers**		**Math teachers**	
	%	SE	%	SE
Travel distance to school	6.3	1.47	7.8	1.56
Location of school	4.9	0.65	2.4	0.74
Quality of the school buildings	2.5	1.00	1.2	0.17
Availability of teacher housing	**13.8**	2.44	**9.8**	1.49
Quality of teacher housing	2.8	1.49	1.2	0.62
Availability of classroom furniture	3.8	1.14	2.5	1.12
Quality of classroom furniture	0.3	0.10	1.6	0.75
Level of teacher salary	**39.4**	3.19	**45.4**	3.17
Timely payment of salaries	4.5	1.59	4.1	1.35
Seeing pupils learn	**10.2**	1.90	**12.0**	2.45
Availability of classroom supplies	5.0	1.52	2.6	0.94
Quality of school management and administration	0.6	0.34	1.3	1.17
Amicable working relationships	1.5	0.87	0.6	0.48
Good relationships with the community	0.3	0.33	0.0	0.00
Expanded opportunities for promotion	1.3	0.59	0.2	0.17
Opportunities for professional development	2.9	0.98	7.1	1.94

Source: SACMEQ database, 2004

Table 6.2 shows that in Mozambique both reading and mathematics teachers see the level of their salary as the main indicator of job satisfaction. For instance, 39% and 45% of reading and mathematics teachers respectively see the level of salary linked to job satisfaction. The level of salary is followed by the availability of teacher housing (14%) and by seeing pupils learn (10%) for reading teachers, while for mathematics teachers these reasons are reversed with seeing pupils learn (12%) following the level of salary, and then the availability of teacher housing (10%). Apparently, the quality of the classroom furniture, school management and administration, amicable working relationships, good relationships with the community and expanded opportunities for promotion were not seen as related to the teachers' job satisfaction.

6.1.2 Teacher Characteristics in SACMEQ Countries

In reporting the results, it should be emphasized that reading and mathematics teachers have had various types of teacher training and as a result, have attained different academic levels. Therefore, although some comparisons have been made among SACMEQ countries, these results must be interpreted with caution because they are based on different systems, different types of teacher training and different levels of socio-economic development. However, not all SACMEQ countries have separate subject teachers, such as for mathematics and reading. In countries such as Botswana, Lesotho, Mauritius and Zambia, mathematics and reading are taught by the same teacher.

Education in all SACMEQ countries is founded on the British education tradition, except in Mozambique, which followed the Portuguese system, with Portuguese being the official language and medium of instruction from Grade 1. In 2004, Mozambique changed to bilingual education, using local languages in some schools in rural and homogeneous areas. Hence, by the time pupils reach Grade 6 they have had at least 6 years of schooling in Portuguese. Language, specifically the official languages, the home languages and language of instruction must be taken into account in other SACMEQ countries. Usually there is more than one official language, one of them being English. All of these countries offer bilingual education, and the local language is the medium of instruction in the lower grades of the primary school. In Tanzania and Zanzibar, Kiswahili is the language of instruction until Grade 7, but Uganda has introduced English as the language of instruction from Grade 1. Mauritius has a parallel language programme starting in Grade 1. Teaching in Portuguese from Grade 1 in Mozambique should ensure that the level of comprehension and knowledge is good when compared with that of pupils in other SACMEQ countries, where English is introduced as the language of instruction only later on in the primary phase. However, because the majority of pupils in Mozambique do not speak Portuguese as a mother tongue, Portuguese is taught from Grade 1 using methodology for second language teaching to ensure that the pupils firstly acquire the language, and then develop it.

As previously stated, there are three significant variables to take into consideration in teacher performance: the first one is the academic level of the teacher, the second is the level of professional teacher training, and the third one is the extent of teaching experience.

Table 6.3 below summarises the training and qualifications of primary school teachers in SACMEQ countries, as well as the language of instruction.

Table 6.3

A summary of primary school teacher training qualifications in SACMEQ countries

Coun-tries	School System (General Education: Primary and Secondary)	Language medium of Instruction (Grade)		TEACHER TRAINING COURSES			Grades To Teach	References
		Local	English Portuguese Kiswahili Afrikaans French	Current Courses	Entr. Level	Du		
BOT	7-3-2	1-4	**5+**	Diploma Primary Education	12	3	1-7	Keitheile and Mokubung, 2005
KEN	8-4	1-3	4+	Primary teacher Certificate	12	2	1-8	Onsomu, Nzomo and Obiero,2005
LES	7-5	1-3	4	Primary Teacher Certificate (PTC)	12	2	1-7	Mothibeli and Maema, 2005
MAL	8-4	1-4	5+	Primary Teaching Certificate	12	2	1-8	Chimombo, Kunje, Chimuzu and Mchikoma, 2005
MAU	6-5-2	-	1+	Primary Teacher Training	11	2	1-6	Kulpoo and Soonarane, 2005
MOZ	7-3-2	-	1+	Instituto do Magistério Primário	10	2	1-7	Passos, Nahara, Magaia and Lauchande, 2005
NAM	7-3-2	1-4	5+	Basic Educ Teacher Diploma	12	3	1-10	Makuwa, 2005
SEY	6-5	1-2	3+	Diploma of Education	11	4	1-6	Leste, Valentin and Hoareau, 2005
SOU	3-3-3	1-3*	4+*	Diploma in Education	12	4	1-7	Moloi and Strauss, 2005
SWA	7-3-2	1-3	4+	Diploma Primary Education	12	3	1-7	Shabalala, 2005
TAN	7-4-2	1-7	-	Certificate Education Training	12	2	1-7	Mrutu, Ponera and Nkumbi, 2005
UGA	7-4-2	-	1+	Primary Teacher College	11	2	1-7	Byamugisha and Ssenabulya, 2005
ZAM	9-3	1-3	4+	Primary Certificate	12	2	1-9	Ministry of Education, 1996
ZAN	7-3-2-2	1-7	-	Certificate Teacher for Primary Schools	12	2	1-7	Nassor, Abdallah, Said and Salim, 2005

Source: SACMEQ II Policy Reports, 2005

Legend: Educ. = Education; Entr. = Entrance level; Du = Duration

* In South Africa from Grade 1 to 3, the policy gives power to school governing bodies to decide. The recommendation is to use mother tongue.

From 4+ the policy gives power to school governing bodies to decide. Currently either English or Afrikaans is used.

Table 6.3 illustrates that Grade 12 is the entrance level for teacher training colleges in all SACMEQ countries, except in Mozambique, where the entrance level is Grade 10. This low level of entry and the two-year duration of the course, which is shorter than duration in the other countries, could explain the relatively weak performance of Mozambican teachers in the SACMEQ II tests. In two countries, namely Seychelles and South Africa, the duration of the course is four years and the entrance requirements are Grades 11 and 12 respectively, which means that these teachers tend to be better qualified. In contrast, the duration of the teacher training course is two or three years in the remaining SACMEQ countries.

Taking into consideration that teachers in primary school have to teach from Grades 1 to 6, 7 or 8, the trainees should have a high academic level in order to ensure that they know the subject matter that they have to teach. However, if they encounter problems in terms of subject knowledge, it is crucial to consider extra lessons or an enrichment programme during the teacher training process, which would improve their content knowledge of primary school subjects.

The academic level of trainee teachers is thus an important factor as it provides the basis for professional training, contributing to the capacity of understanding and analysing the social objectives within the socio-cultural and organisational context where this function takes place. It is essential to note that the academic level is a necessary foundation for the future role of the teacher in school and in the society where the schools are located. Teacher training institutions should thus be made aware that in training teachers of high quality teachers, it is vital to consider the academic entry level of the candidate as well as the duration of the course. Entry quality and duration are factors to take into consideration during the planning of teacher training curricula.

Sex, age and socio-economic status of teachers in SACMEQ countries

As referred to in Section 6.1.2, Botswana, Lesotho, Mauritius and Zambia, mathematics and reading are taught by the same teacher which is the reason for the appearance of the results for one subject.

When examining teacher performance, the sex, age and socio-economic status of teachers need to be considered. Table 6.4 shows the means, percentages and sampling errors for age, gender, and socio-economic background (which is reflected in the index of compiled items, under possessions at home) of reading and mathematics teachers in SACMEQ countries.

Table 6.4

Means, percentages, and sampling errors for age, gender, and socio-economic background of reading and mathematics teachers

Country	**Reading teachers**						**Mathematics teachers**					
	Age (years)		Gender (female)		**Possessions** at home (index)		Age (years)		Gender (female)		**Possessions** at home (index)	
	Mean	SE	%	SE	Mean	SE	Mean	SE	%	SE	Mean	SE
Botswana	34.9	0.46	66.7	2.68	7.3	0.18	-	-	-	-	-	-
Kenya	37.6	0.72	46.0	4.00	5.0	0.16	37.7	0.67	24.4	3.19	4.9	0.15
Lesotho	41.1	0.72	75.1	3.38	5.0	0.17	-	-	-	-	-	-
Malawi	32.4	0.68	30.3	4.18	4.3	0.19	33.1	0.59	28.1	4.02	4.2	0.19
Mauritius	44.9	0.50	28.1	2.71	10.9	0.10	-	-	-	-	-	-
Mozambique	32.8	0.51	29.7	2.99	4.0	0.14	31.2	0.43	26.1	2.76	3.9	0.15
Namibia	34.8	0.46	52.1	3.22	6.9	0.17	36.8	0.48	48.9	3.07	6.5	0.15
Seychelles	38.6	0.23	98.8	0.20	9.2	0.05	32.0	0.16	80.8	0.78	8.9	0.05
South Africa	38.9	0.88	57.8	4.25	9.2	0.19	38.2	0.63	52.5	4.48	9.1	0.20
Swaziland	34.7	0.64	68.5	4.06	6.5	0.20	34.0	0.59	51.7	4.48	6.7	0.23
Tanzania	38.0	0.67	51.9	4.11	4.2	0.16	37.0	0.56	23.9	3.42	3.9	0.17
Uganda	33.1	0.69	17.4	3.29	3.6	0.16	31.9	0.55	7.8	2.70	3.4	0.16
Zambia	35.8	0.65	52.9	4.25	5.1	0.22	-	-	-	-	-	-
Zanzibar	33.7	0.08	63.0	0.50	4.2	0.04	34.4	0.08	57.9	0.45	4.2	0.03
SACMEQ	**36.5**		**52.7**		**6.1**		**34.6**		**40.2**		**5.57**	

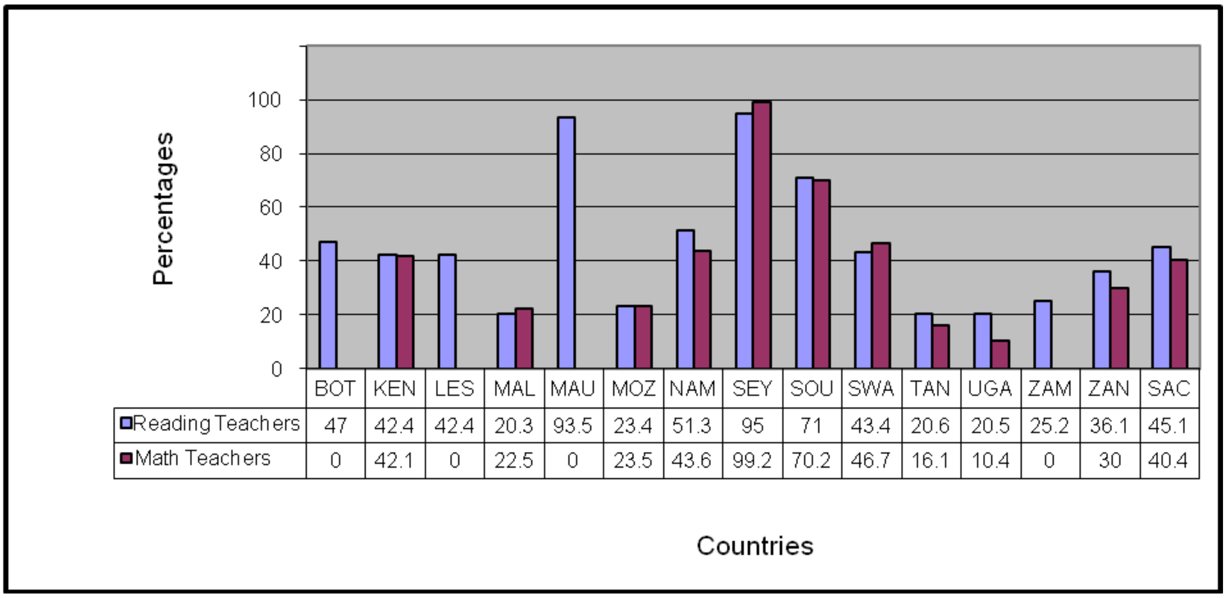
Source: Data from SACMEQ II database, 2004

As indicated in Table 6.4, the pupils in SACMEQ countries were taught by reading teachers who were on average 36.5 years old and by mathematics teachers who were on average 34.6 years old. The ages ranged from about 33 years in Malawi to 45 years in Mauritius for reading teachers, and for mathematics teachers the ages ranged from 31 in Mozambique to 38 years in South Africa. Mozambique had the youngest teachers in the region, which could be related to the need for them to find jobs which offered better salaries and could thus increase the number of possessions at home (4.0 in 2000). Older, more experienced teachers therefore tend to leave the profession in search of better paying positions in other professions.

The gender of the teacher also needs to be taken into account. Just over half of the pupils in Grade 6 (53%) were taught reading by teachers who were female. However, large variations occurred among the SACMEQ countries, ranging from a high proportion of female reading teachers (99%) in Seychelles to a low proportion (17%) in Uganda. Mathematics presented a different picture, with fewer pupils (40.2%) being taught mathematics by teachers who were female. There were also large variations among the SACMEQ countries, ranging from only 8% of pupils in Uganda being taught by female teachers, to 81% in Seychelles.

An index for socio-economic status (SES) was compiled (see Section 6.1.1.1). The average number reflecting the social status for reading teachers was 6.1 (out of 13) and for mathematics 5.6. There were some variations in the means of this index among the SACMEQ countries, reading teachers ranging from 4 in Mozambique to 10.9 in Mauritius, and mathematics teachers ranging from 3.4 in Uganda to 9.1 in South Africa. In spite of problems with the economic development level in all of the SACMEQ countries, the fact that Mauritian teachers were the oldest and had more years of experience while Mozambican teachers were the youngest may make a difference in terms of teacher possessions at home.

Figure 6.3 shows the percentage of teachers in the SACMEQ countries who consider that they are living in acceptable conditions (see Appendix 8).



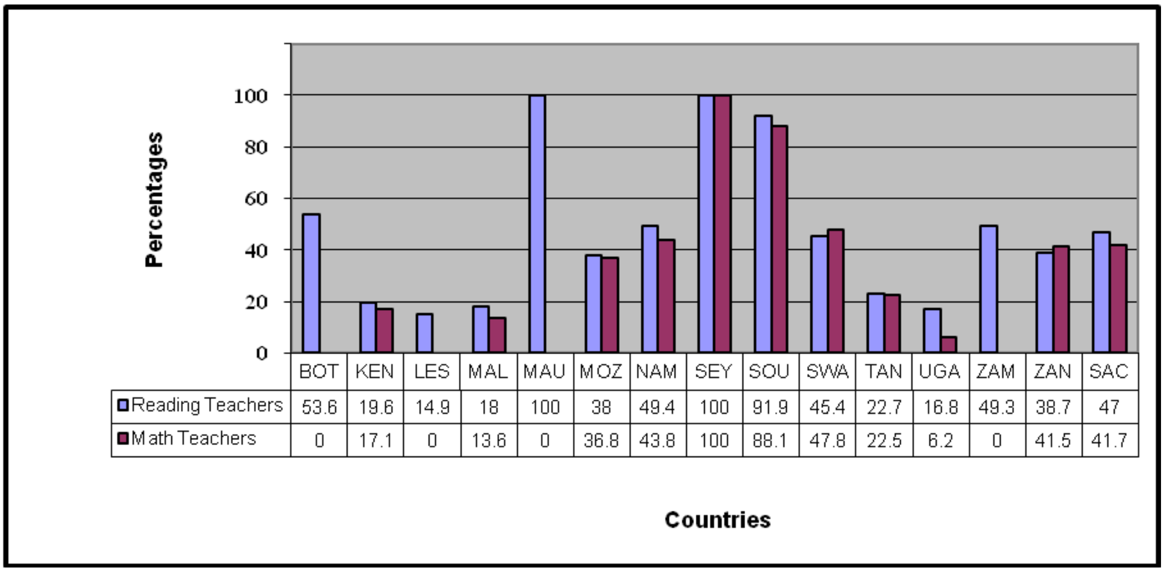
	BOT	KEN	LES	MAL	MAU	MOZ	NAM	SEY	SOU	SWA	TAN	UGA	ZAM	ZAN	SAC
Reading Teachers	47	42.4	42.4	20.3	93.5	23.4	51.3	95	71	43.4	20.6	20.5	25.2	36.1	45.1
Math Teachers	0	42.1	0	22.5	0	23.5	43.6	99.2	70.2	46.7	16.1	10.4	0	30	40.4

Source: Data from SACMEQ II database (2004)

Figure 6.3 Percentages for teacher housing in acceptable conditions (SACMEQ II)

Figure 6.3 indicates that 45% of Grade 6 reading and 40.4% of mathematics teachers reported their living conditions were acceptable. This summary means that more than half of the reading and mathematics teachers were not satisfied with their living conditions**.** Some SACMEQ countries exhibited different percentages for reading and mathematics teachers, such as Namibia (51% and 44%), Tanzania (21% and 16%) and Uganda (21% and 10%). There were variations in the percentage of teachers who felt that they were living in acceptable conditions from 20% in Malawi to 95% in Seychelles for reading teachers, and from 10.4% in Uganda to 99% in Seychelles for mathematics teachers.

Figure 6.4 shows the percentage of homes with electricity in reading and mathematics teachers' homes (see Appendix 9).



Source: Data from SACMEQ II database (2004)

*Figure 6.*4 Percentage of teachers that had electricity at home

Figure 6.4 illustrates the percentage of Grade 6 teachers who had electricity as a source of light in their homes. More than half of the pupils had mathematics (58%) and reading teachers (53%) who relied on candles or oil lamps for lighting in their homes, meaning that on average only 42% of mathematics teacher and 47% of reading teachers had electricity in their homes. A large variation was seen between teachers that used candles or oil lamps as a source of lighting, ranging from 94% in Uganda to 0% in Mauritius and Seychelles for mathematics teachers. With reading teachers, the variation ranged from 84% in Lesotho to 0% in Mauritius and Seychelles. These results show that Mauritian and Seychellois mathematics and reading teachers had the highest percentage usage (100%) of electricity as a source of lighting. In contrast, Uganda recorded the lowest percentage of electricity in homes, with 6% and 15% for mathematics and reading teachers respectively.

Job satisfaction in SACMEQ countries

Teacher motivation plays an important role in developing teacher and pupil interaction, particularly in assisting the learning process, which should be pupil-centred. SACMEQ has paid special attention to the issue of motivation particularly focusing on the factors that contribute most to job satisfaction, because it is believed that if teachers are satisfied with their work and work environment, they tend to work more effectively.

The SACMEQ study compiled a comprehensive list of indicators of job satisfaction (as seen in Table 6.2) but for this part of the study, only those two indicators identified by the teachers in SACMEQ countries as the most important source for job satisfaction were selected for discussion. Table 6.5 presents each country's choice of indicators.

Table 6.5

Percentages and sampling errors for teacher ratings of most commonly occurring reasons for job satisfaction

COUN-TRIES	'Most common' indicator of job satisfaction	Reading teachers		Mathematics teachers	
		%	SE	%	SE
BOT	Opportunities for professional development	2.38	20,2	-	-
	Seeing pupils learn	2.23	19.6		
KEN	Level of teacher salary	30.7	3.69	31.2	3.60
	Seeing pupils learn	23.8	3.64	-	-
	Availability of classroom supplies	-	-	18.7	3.40
LES	Quality of school management and administration	3.08	15.7	-	-
	Seeing pupils learn	2.93	16.9	-	-
MAL	Level of teacher salary	26.3	3.95	27.4	3.99
	Seeing pupils learn	16.4	3.42	-	-
	Availability of classroom supplies	-	-	11.9	3.00
MAU	Level of teacher salary	50.3	3.22	-	-
	Seeing pupils learn	24.1	2.65	-	-
MOZ	Level of teacher salary	39.4	3.19	45.4	3.17
	Availability of teacher housing	13.8	2.44	-	-
	Seeing pupils learn	-	-	12	2.45
NAM	Availability of classroom supplies	17.3	2.49	16.5	2.33
	Quality of school management and administration	16.3	2.48	18.1	2.36
SEY	Seeing pupils learn	52.1	0.89	58.8	0.91
	Quality of school management and administration	22.2	0.83	-	-
	Level of teacher salary	-	-	22.2	0.66
SOU	Seeing pupils learn	34.9	3.85	32.4	3.78
	Level of teacher salary	12.1	3.68	-	-
	Availability of classroom supplies	-	-	14.1	2.91
SWA	Seeing pupils learn	22.2	3.37	18.5	3.18
	Quality of school management and administration	16.6	3.20	14.2	3.06
TAN	Level of teacher salary	32.2	3.69	32.6	3.74
	Availability of classroom supplies	13.5	2.62	12.4	2.74
UGA	Level of teacher salary	44.5	4.44	43.2	5.32
	Seeing pupils learn	12.0	2.62	-	-
	Opportunities for professional development	-	-	8.6	3.16
ZAM	Level of teacher salary	37.7	3.93	-	-
	Seeing pupils learn	14.9	2.32	-	-
ZAN	Level of teacher salary	31.3	0.57	30.6	0.43
	Timely payment of salaries	17.6	0.52	20.7	0.48

Source: Data from SACMEQ II database, 2004

In summary, Table 6.5 shows that the most important and most commonly occurring sources of job satisfaction in some SACMEQ countries for the majority of Grade 6 reading and mathematics teachers, was seeing pupils learn. The variation among countries ranged from 52% in Seychelles to 2% in Botswana for reading teachers and from 59% in Seychelles to 12% in Mozambique for mathematics teachers. The second most important source of job satisfaction for teachers was the level of salary, and here the variations ranged from 50% in Mauritius to 12% in South Africa for reading teachers and from 45% in Mozambique to 22% in Seychelles for mathematics teachers.

There were some countries whose teachers gave the quality of school management and administration and the availability of classroom supplies as the main source of job satisfaction.

Those findings were consistent with the results of the study carried out in Jamaica by Rodgers-Jenkinson and Chapman (as cited in Fraser, Draper and Taylor 1998, p.62), which showed that:

> *teachers who worked in higher prestige schools characterised by good working conditions, who enjoyed good relationships with other teachers and parents, and who felt a part of school structure, tended to report high levels of job satisfaction.*

In contrast, the Mozambican results are consistent with the observations made earlier, that the few possessions that teachers had (reflecting their low income) and the generally low quality of teacher housing affects job satisfaction.

Generally speaking, the level of economic and social status in SACMEQ countries is very low. This low SES may affect the motivation of the teachers. But, in spite of the economic and social status problem, teachers in SACMEQ countries show high levels of professionalism when they state that pupil achievement is one of the reasons for job satisfaction. Despite their poor working conditions evident in the lack of resources, classroom equipment, books and even basic services such as electricity, teachers are committed to educating the youth.

The next section described teachers' qualification in Mozambique and in SACMEQ countries in terms of academic and professional training as well as their professional experience

6.1.3 Teachers' Qualification and Experience in Mozambique

There are three important variables to take into consideration in teacher performance: the first one is the academic level of the teacher, the second is the professional teacher training, and the third one is the teacher experience.

Academic level in Mozambique

The academic level attained by teachers is one of the indicators considered as making a difference in teacher performance and consequently pupil performance.

Table 6.6 shows the level of academic education of reading and mathematics teachers in Grade 6.

Table 6.6

Academic level of reading and mathematics teachers in Mozambique

Provinces	Academic level																			
	Reading Teachers										Mathematics Teachers									
	Primary		Junior Secondary		Senior Secondary		A-Level		Tertiary		Primary		Junior Secondary		Senior Secondary		A-Level		Tertiary	
	%	SE	%	SE	%	SE	%	SE	%	SE	%	SE	%	SE	%	SE	%	SE	%	SE
CAB	1.9	0.75	11.2	5.67	83.9	6.33	2.9	2.94	0.0	0.00	8.9	8.94	13.8	8.22	77.2	11.22	0.0	0.00	0.0	0.00
GAZ	2.7	2.75	33.4	11.38	63.9	11.35	0.0	0.00	0.0	0.00	6.7	6.68	28.8	9.93	64.5	10.77	0.0	0.00	0.0	0.00
INH	8.05	5.50	15.3	7.64	76.7	10.11	0.0	0.00	0.0	0.00	8.7	6.19	42.6	15.44	48.7	14.56	0.0	0.00	0.0	0.00
MAC	4.4	4.35	1.7	1.66	75.9	9.18	18.1	5.60	0.0	0.00	0.0	0.00	4.1	4.09	95.9	4.09	0.0	0.00	0.0	0.00
MAN	0.0	0.00	38.1	12.47	61.9	12.47	0.0	0.00	0.0	0.00	0.0	0.00	28.3	10.23	71.7	10.23	0.0	0.00	0.0	0.00
MAP	3.3	3.33	10.2	7.98	77.2	9.06	9.2	4.65	0.0	0.00	0.0	0.00	18.7	8.45	81.3	8.45	0.0	0.00	0.0	0.00
NAM	2.7	2.66	7.4	2.04	77.8	7.44	9.4	6.44	2.7	2.68	0.0	0.00	8.2	4.61	81.8	7.65	10.0	6.86	0.0	0.00
NIA	0.0	0.00	16.2	5.94	83.8	5.94	0.0	0.00	0.0	0.00	0.0	0.00	35.0	10.00	65.0	10.00	0.0	0.00	0.0	0.00
SOF	0.0	0.00	19.8	7.42	80.2	7.42	0.0	0.00	0.0	0.00	2.0	2.02	7.6	4.98	89.7	5.03	0.7	0.72	0.0	0.00
TET	0.0	0.00	14.5	5.30	85.5	5.30	0.0	0.00	0.0	0.00	12.1	5.92	10.2	4.40	77.7	8.80	0.0	0.00	0.0	0.00
ZAM	11.5	8.17	40.8	9.37	47.7	9.70	0.0	0.00	0.0	0.00	0.0	0.00	23.1	8.41	76.9	8.41	0.0	0.00	0.0	0.00
MOZ	4.0	1.48	17.2	2.20	72.7	3.06	5.8	1.51	0.3	0.33	2.7	1.00	17.9	2.59	78.1	2.73	1.3	0.84	0.0	0.00

Source: SACMEQ database, 2004 n = n =

Very few children are taught by tertiary educated teachers (0.3% in reading and 0% in mathematics) and small percentages are taught by teachers with A-levels (6% in reading and 1% in mathematics). About 1 in 5 pupils (17%) in Mozambique are taught by reading teachers who have undergone the required basic level of education (junior secondary schooling) while 18% of pupils are taught by mathematics teachers with the required basic level of education. Zambézia and Inhambane provinces had the highest percentage of reading teachers who had only primary education, 12% and 8% respectively. Tete (12%), Cabo Delgado (9%), Inhambane (9%), and Gaza (7%) had the highest percentage of pupils being taught by mathematics teachers who had only primary school education.

However, the results show that 96% of reading teachers and 97% of mathematics teachers in Mozambique meet government policy requirements of a basic level of education. According to the regulations of the MEC, to become a teacher in upper primary education, at least the junior secondary education, which is 10 years of schooling, must have been completed. However, this criterion means that teachers with primary education are on the same academic level as the pupils they are teaching, a fact which could result in high risk and serious consequences in terms of the quality of the education.

Professional training and teacher experience in Mozambique

As stated previously, teacher training and teacher experience are important factors to consider when assessing and evaluating teacher and pupil performance. Table 6.7 provides the number of years of teaching experience and teacher training of Mozambican reading and mathematics teachers.

Table 6.7

Average number of years of training for reading and mathematics teachers, and years of experience

Provinces	Reading Teachers				Mathematics Teachers			
	Experience (Years)		Training (Years)		Experience (Years)		Training (Years)	
	Mean	**SE**	**Mean**	**SE**	**Mean**	**SE**	**Mean**	**SE**
CAB	12.1	1.42	1.6	0.23	8.8	1.51	1.7	0.26
GAZ	10.2	2.16	0.8	0.22	7.1	1.46	1.7	0.29
INH	7.7	2.03	1.5	0.37	7.8	2.11	1.2	0.34
MAC	11.4	1.09	2.4	0.25	11.9	1.06	2.5	0.12
MAN	11.6	1.50	2.0	0.32	9.8	1.20	2.2	0.25
MAP	7.4	1.16	1.5	0.31	7.7	1.19	1.9	0.30
NAM	8.6	1.54	1.9	0.28	8.6	1.37	2.1	0.24
NIA	5.5	0.96	1.1	0.18	6.6	0.76	1.7	0.20
SOF	14.3	1.77	2.6	0.13	11.1	1.04	2.5	0.09
TET	9.5	1.85	1.6	0.29	10.1	1.65	1.8	0.27
ZAM	9.3	1.80	1.3	0.28	7.0	0.73	0.9	0.25
MOZ	**9.9**	**0.52**	**1.8**	**0.09**	**9.1**	**0.43**	**1.9**	**0.07**

Source: SACMEQ database, 2004

Table 6.7 shows that Grade 6 Mozambican pupils were being taught by reading teachers who averaged 9.9 years of experience. In Sofala province, teaching experience was slightly higher at 14.3 years of experience whereas teachers in Niassa have much less experience, with 5.5 years of teaching experience. The experience of Grade 6 mathematics teachers followed a pattern similar to that of the reading teachers, except that Maputo Cidade has the most experienced teachers (11.9 yrs).

Taking into consideration that the duration of a teacher training course is two or three years, it appears that just under a quarter of all Mozambican Grade 6 teachers (23%) had not received any teacher training (Passos, Nahara, Magaia and Lauchande, 2005). Sofala province's reading teachers have received the most training (2.6 years) and the same is true of their mathematics teachers (2.5 years). Maputo Cidade's teachers (2.4 and 2.5 years) had received almost the same amount of training. Gaza has the least trained reading teachers (0.8 years) and Zambézia the least trained mathematics teachers (0.9 years).

6.1.4 Teachers' Qualifications and Experience in SACMEQ Countries

Teacher qualifications and experience play a major role in education, but as previously indicated, teacher qualifications are compromised by their academic level in terms of the highest grade level that student teachers achieved at school, as well as their professional training at teacher training institutions. A competent teacher must possess the requisite knowledge and skills and be able to use them to achieve the intended goals (Shulman, 1986). Table 6.8 illustrates the wide range of academic education levels of reading and mathematics teachers across SACMEQ countries.

Academic level in SACMEQ countries

Table 6.8 shows that in the SACMEQ countries, on average, Grade 6 pupils were taught by reading teachers of whom the majority (45%) had senior secondary education, with about 22% completing A-levels. However, 12% had only primary education. Unfortunately for the region, a mere 6% had undertaken tertiary education. Lesotho had the highest percentage of reading teachers that had only primary education (51%) while Mauritius had the lowest (0.2%).

Table 6.8

Percentages and sampling errors for academic level of reading and mathematics teachers

Coun-try	Reading Teachers										Mathematics Teachers									
	Primary		Junior Secondary		Senior Secondary		A-Level		Tertiary		Primary		Junior Secondary		Senior Secondary		A-Level		Tertiary	
	%	**SE**	**%**	**SE**	**%**	**SE**	**%**	**SE**	**%**	**SE**	**%**	**SE**	**%**	**SE**	**%**	**SE**	**%**	**SE**	**%**	**SE**
BOT	8.2	1.56	47.4	2.97	30.1	2.57	8.4	1.48	5.8	1.30	-	-	-	-	-	-	-	-	-	-
KEN	1.0	0.70	2.2	0.99	76.3	3.30	17.3	2.92	3.3	1.49	0.0	0.00	2.03	0.96	80.1	3.04	17.3	2.88	0.3	0.29
LES	50.9	3.97	12.2	2.50	15.3	2.97	16.5	2.90	5.1	1.73	-	-	-	-	-	-	-	-	-	-
MAL	1.5	1.09	40.7	4.56	57.8	4.58	0.0	0.0	0.0	0.0	0.0	0.00	30.6	4.17	69	4.17	04	0.44	0.0	0.0
MAU	0.2	0.19	1.4	0.69	53.4	2.80	42.4	2.92	2.6	0.61	-	-	-	-	-	-	-	-	-	-
MOZ	4	1.48	17.2	2.20	72.7	3.06	5.8	1.5	0.3	0.32	2.7	1.00	17.9	2.59	78.1	3.73	1.3	0.84	0.0	0.0
NAM	13.6	2.18	9.2	1.81	46.5	3.18	17.8	2.38	13	1.96	17.8	2.42	8.5	1.72	45.6	3.19	17.9	2.39	10.2	1.70
SEY	1.1	0.26	7.2	0.55	32.1	0.77	53.6	0.83	6	0.36	0.0	0.00	2.1	0.31	18.7	0.62	75.7	0.71	3.5	0.41
SOU	27.1	3.77	4.6	1.61	18.8	3.36	24	3.58	25.5	4.33	33.2	4.07	2.6	1.06	18.8	3.30	18	3.26	27.4	4.18
SWA	9.7	2.6	3.1	1.33	13.5	2.97	60.9	4.34	12.8	3.23	8.8	2.31	1.0	0.63	18.5	3.63	61.3	4.32	10.4	2.50
TAN	25.2	3.34	71.3	3.45	0.9	0.70	2.1	0.96	0.5	0.45	7.7	2.09	87.4	2.60	2.9	1.31	1.9	0.94	0.0	0.00
UGA	4.4	1.59	1.4	1.05	55.4	4.32	36.1	4.15	2.8	1.30	0.4	0.39	0.8	0.75	62.5	5.05	29.6	4.69	6.8	2.80
ZAM	10.2	1.85	6.0	1.56	71.6	3.39	11.6	2.47	0.6	0.47	-	-	-	-	-	-	-	-	-	-
ZAN	0.9	0.19	7.1	0.30	83.9	0.51	8.0	0.40	0.0	0.0	0.7	0.00	9.8	0.35	83,2	0.40	6.2	0.24	0.0	0.00
SAC	**11.2**		**16.5**		**44,8**		**21.7**		**6**		**7.13**		**16.2**		**47.7**		**23.3**		**6**	

Source: Data from SACMEQ II database, 2004

Botswana (with 48%) and Tanzania (71% - reading and 87% - mathematics) had the most reading and mathematics teachers with junior secondary education. The majority of reading and mathematics teachers in Seychelles had A-levels (54% and 76%) as well as in Swaziland (61% and 61% respectively). South Africa had the highest percentage of reading (26%) and mathematics teacher (27%) with tertiary education. Table 6.8 illustrates that the academic education of mathematics teachers of Grade 6 followed a very similar pattern to that of reading teachers.

Overall, in the SACMEQ countries 48 % of Grade 6 pupils were taught by mathematics teachers who had completed senior secondary education, 7% of pupils had mathematics teachers with only primary education (which is a concern for education), 23% had teachers who had completed A-levels, but only 6% of pupils had mathematics teachers who had tertiary education.

Among the various countries and at all levels, there were large variations in the number of mathematics teachers at specific levels of academic education. Teachers with only primary education ranged from none in Kenya, Malawi and Seychelles to 33% in South Africa. Teachers with A-Levels ranged from none in Malawi to 76% in Seychelles. Malawi, Mozambique, Tanzania and Zanzibar had no teachers with a tertiary education, compared with South Africa, which had the most tertiary educated teachers (27%).

The fact that 51% of Lesotho's reading teachers and 33% of South African mathematics teachers had only primary education may negatively affect the quality of education, because one of the conditions for the high performance of teachers is a deep knowledge of the subject content that the teachers have to teach. Seychelles is at the opposite end of the scale for mathematics teachers. There, the majority of the teachers had A-levels, a fact which may positively affect and enhance the quality of education.

Professional training and teachers' experience in SACMEQ countries

Table 6.9 presents means and sampling errors for the experience and training of reading and mathematics teachers in SACMEQ II.

Table 6.9 shows that SACMEQ Grade 6 pupils were taught by teachers who on average had 12.9 and 10.8 years of experience for reading and mathematics teachers respectively. Some variations were recorded, ranging from 21.7 years in Mauritius to 7.7 years in Malawi in reading, and from 13.8 years in Kenya to 6.4 years of experience in Uganda in mathematics.

Table 6.9

Means and sampling errors for experience and training of reading and mathematics teachers

Country	Reading teachers				Mathematics teachers			
	Experience (years)		Training (years)		Experience (years)		Training (years)	
	Mean	**SE**	**Mean**	**SE**	**Mean**	**SE**	**Mean**	**SE**
Botswana	10.8	0.40	2.2	0.05				
Kenya	14.0	0.64	2.1	0.04	13.8	0.56	2.1	0.04
Lesotho	16.6	0.80	2.7	0.11				
Malawi	7.7	0.51	1.5	0.09	7.8	0.50	1.4	0.10
Mauritius	21.7	0.52	2.2	0.05	-	-	-	-
Mozambique	9.9	0.52	1.8	0.09	9.1	0.43	1.9	0.07
Namibia	10.0	0.42	2.7	0.06	11.7	0.48	2.6	0.05
Seychelles	20.0	0.25	2.9	0.02	12.1	0.18	3.3	0.02
South Africa	14.2	0.66	3.2	0.06	13.6	0.59	3.2	0.07
Swaziland	10.1	0.58	2.7	0.07	9.7	0.58	2.5	0.07
Tanzania	14.1	0.62	2.2	0.05	12.5	0.53	2.2	0.05
Uganda	8.6	0.72	2.3	0.08	6.4	0.43	2.3	0.09
Zambia	11.5	0.63	2.0	0.04				
Zanzibar	13.1	0.09	1.7	0.01	11.5	0.09	1.8	0.01
SACMEQ	**12.9**		**2.2**		**10.8**		**2.3**	

Source: Data from SACMEQ II database, 2004

The mean of professional training in SACMEQ countries was 2.2 years in reading and 2.3 in mathematics. Taking into consideration the duration of the current courses, it seems that some countries had inadequately trained teachers, or that the duration of some of the courses was previously less than is currently the case. The variations in professional training ranged from 3.2 in South Africa to 1.5 years of training in Malawi for reading teachers, and from 3.3 in Seychelles to 1.4 years of training in Malawi for mathematics teachers.

Taking into consideration that the teachers are teaching from Grades 1 to 6 or 7, it seems that the duration of the current courses in some countries such as Lesotho, Malawi, Mauritius, Mozambique, Uganda and Zanzibar is insufficient for the initial professional development given the curriculum, the subject knowledge development, and the methodological expertise needed in order to train teachers effectively to teach all of the subjects required in lower and upper primary schools. In SACMEQ countries such as Malawi and Uganda, many teachers in the profession are not highly experienced, possibly meaning that teachers seldom stay in the profession, a phenomenon which could be related to the level of salary and possessions, as referred to previously. Mauritius, for instance, had the oldest teachers in the region, the highest level of economic status (10.9 possessions at home) and teachers with highest years of experience (21.7 yrs). The same situation exists in Seychelles (38.6 yrs of age, 20 yrs of experience and 9.2 possessions at home) and South Africa (38.9 yrs of age, 14.2 yrs of experience and Level 9.2 possessions at home). The two variables, age and years of experience, seem to be related to job satisfaction and the number of possessions at home.

Cross tabulation of the professional training and academic level of reading teachers in Mozambique and in other SACMEQ countries was computed for a more detailed analysis, and is shown in Tables 6.10 and 6.11.

6.1.5 Teachers' Academic and Professional Qualification in Reading in Mozambique

Table 6.10 show the percentages for professional training and academic level of reading teachers in Mozambique

Table 6.10

Percentages for professional training and academic level of reading teachers in Mozambique

			TEACHERS' ACADEMIC QUALIFICATION					
			Prim.	**Jun. sec**	**Sen. Sec.**	**A-lev.**	**Tert.**	**Total**
T/ PROF QUAL	**No teacher training**	Count (No of teachers)	0 0	10	70	0 6	0 0	86
		% within t/qual-prof	0.0	11.6	81.4	7.0	.0	100
		% within t/qualif-aca	0.0	14.9	24.5	28.6	.0	22.0
		% of total	**0.0**	**2.6**	**17.9**	**1.5**	**.0**	**22.0**
	less than one year	Count (No of teachers)	0 4	2	45	5	0	56
		% within t/qual-prof	7.1	3.6	80.4	8.9	.0	100
		% within t/qualif-aca	25.0	3.0	15.7	23.8	.0	14.3
		% of total	**1.0**	**.5**	**11.5**	**1.3**	**.0**	**14.3**
	one year	Count (No of teachers)	0 1	6	5	1	0	13
		% within t/qual-prof	7.7	46.2	38.5	7.7	.0	100
		% within t/qualif-aca	6.3	9.0	1.7	4.8	.0	3.3
		% of total	**0.3**	**1.5**	**1.3**	**.3**	**.0**	**3.3**
	two years	Count (No of teachers)	0 2	20	68	0	0	90
		% within t/qual-prof	2.2	22.2	75.6	.0	.0	100
		% within t/qualif-aca	12.5	29.9	23.8	.0	.0	23.0
		% of total	**0.5**	**5.1**	**17.4**	**.0**	**.0**	**23.0**
	three years	Count (No of teachers)	07	22	85	0 7	0 0	121
		% within t/qual-prof	5.8	18.2	70.2	5.8	.0	100
		% within t/qualif-aca	43.8	32.8	29.7	33.3	.0	30.9
		% of total	**1.8**	**5.6**	**21.7**	**1.8**	**.0**	**30.9**
	More than three years	Count (No of teachers)	2	7	13	2	1	25
		% within t/qual-prof	8.0	28.0	52.0	8.0	4.0	100
		% within t/qualif-aca	12.5	10.4	4.5	9.5	100.0	6.4
		% of total	**.5**	**1.8**	**3.3**	**.5**	**.3**	**6.4**
TOTAL		Count (No of teachers)	16	67	286	21	1	391
		% within t/qualprof	4.1	17.1	73.1	5.4	.3	100
		% within t/qual-aca	100.0	100.0	100.0	100.0	100.0	100
		% of TOTAL	**4.1**	**17.1**	**73.1**	**5.4**	**.3**	**100**

Source: Data from SACMEQII database, 2004

The analysis of the cross tabulation between professional training and academic qualifications in Table 6.5 shows that 22% of Grade 6 reading teachers in Mozambique had no professional training at all, and 14% had less than one year of professional training. The majority of the teachers had three years of professional training.

The majority of the reading teachers (73%) in Mozambique had senior secondary education. Of these, about 18% had no professional training. A mere 6% of teachers had completed 3 years of teacher training or more. Of the remaining teachers less than 6% had either A-level or tertiary education.

The results of the cross tabulation on the varied teacher training modules reflects the different policies, curriculum, syllabus and teacher training profiles as referred to in Chapter 2. The situation for mathematics teachers follows a similar pattern. However, more teachers have 3 years of training and a larger percentage has completed Senior Secondary education.

6.1.6 Teachers' academic and professional qualification in reading in SACMEQ countries

A cross tabulation of the professional training and academic level of reading teachers for all SACMEQ countries was conducted. Table 6.11 shows the percentage for professional training and the academic level of reading teachers in SACMEQ countries.

Table 6.11

Percentages of teachers, for professional training and academic level of reading teachers in SACMEQ countries

			READING TEACHERS' ACADEMIC QUALIFICATIONS					
			Prim.	**Jun. sec**	**Sen. Sec.**	**A-lev.**	**Tert.**	**Total**
T/QUA -PROF	**No teacher training**	Count (No of teachers)	0 2	31	184	31	09	257
		% within t/qual-prof	0.8	12.1	71.6	12.1	3.5	100
		% within t/qualif-aca	0.3	3.4	7.5	2.6	2.9	4.7
		% of total	**0.0**	**0.6**	**3.3**	**0.6**	**0.2**	**4.7**
	less than one year	Count (No of teachers)	0 9	41	194	14	0 2	260
		% within t/qual-prof	3.5	15.8	74.6	5.4	0.8	100
		% within t/qualif-aca	1.4	4.5	7.9	1.2	0.6	4.7
		% of total	**0.2**	**0.7**	**3.5**	**0.3**	**0.0**	**4.7**
	one year	Count (No of teachers)	21	82	142	34	11	290
		% within t/qual-prof	7.2	28.3	49.0	11.7	3.8	100
		% within t/qualif-aca	3.4	8.9	5.8	2.8	3.6	5.3
		% of total	**0.4**	**1.5**	**2.6**	**0.6**	**0.2**	**5.3**
	two years	Count (No of teachers)	217	591	1399	445	40	2692
		% within t/qual-prof	8.1	22.0	52.0	16.5	1.5	100
		% within t/qualif-aca	34.7	64.4	56.8	37.1	13.0	48.8
		% of total	**3.9**	**10.7**	**25.4**	**8.1**	**0.7**	**48.8**
	three years	Count (No of teachers)	291	124	365	381	88	1249
		% within t/qual-prof	23.3	9.9	29.2	30.5	7.0	100
		% within t/qualif-aca	46.6	13.5	14.8	31.8	28.6	22.7
		% of total	**5.3**	**2.3**	**6.6**	**6.9**	**1.6**	**22.7**
	More than three years	Count (No of teachers)	85	48	178	294	158	763
		% within t/qual-prof	11.1	6.3	23.3	38.5	20.7	100
		% within t/qualif-aca	13.6	5.2	7.2	24.5	51.3	13.8
		% of total	**1.5**	**0.9**	**3.2**	**5.3**	**2.9**	**13.8**
TOTAL		Count (No of teachers)	625	917	2462	1199	308	5511
		% within t/qualprof	11.3	16.6	44.7	21.8	5.6	100
		% within t/qual-aca	100.0	100.0	100.0	100.0	100.0	100
		% of TOTAL	**11.3**	**16.6**	**44.7**	**21.8**	**5.6**	**100**

Source: Data from SACMEQ II database, 2004

The majority of reading teachers in SACMEQ countries (45%) had senior secondary education but only 5% had no professional training. About 5% percent of reading teachers had one year or less while 49%, the majority, had two years of professional training. About 14% had more than three years. Of particular interest is the high percentage of teachers (22%) that had A-Levels. Among this group, about 5% had three years or more of teacher training. In SACMEQ countries overall, 11% of teachers had primary education while 6% had completed tertiary education.

6.1.7 Percentage of Teachers' Academic and Professional Qualification in Reading in each SACMEQ country

Table 6.12 shows the percentages for professional training and the academic level of reading teachers in each SACMEQ countries.

Table 6.12

Percentages for professional training and academic level of reading teachers in each SACMEQ country

COUN-TRY	Teacher Professional	Qualification-	READING TEACHERS' ACADEMIC QUALIFICATIONS					
			Primary	**Jun Sec.**	**Sen. Sec.**	**A-level**	**Tertiary**	**Total**
	No teacher training	% of Total	0.0	0.3	4.5	0.0	0.0	**4.8**
	Less than 1 year	% of Total	0.0	0.8	0.5	0.0	0.0	**1.3**
	2 years	% of Total	7.3	43.0	18.8	4.0	1.5	**74.5**
BOT	3 years	% of Total	0.5	2.0	4.0	3.3	0.8	**10.5**
	More than 3 years	% of Total	0.5	1.5	2.3	1.0	3.8	**9.0**
	% of total		**8.3**	**47.5**	**30.0**	**8.3**	**6.0**	**100**
	No teacher training	% of Total	0.0	0.0	1.1	0.3	0.0	**1.3**
	Less than 1 year	% of Total	0.0	0.0	0.8	0.0	0.0	**0.8**
	1 year	% of Total	0.0	0.0	0.5	0.0	0.0	**0.5**
KEN	2 years	% of Total	0.8	1.9	67.2	15.9	1.9	**87.6**
	3 years	% of Total	0.0	0.3	5.8	0.8	0.8	**7.7**
	More than 3 years	% of Total	0.3	0.0	0.8	0.5	0.5	**2.1**
	% of total		**1.1**	**2.1**	**76.2**	**17.5**	**3.2**	**100**
	No teacher training	% of Total	0.5	2.2	4.9	1.2	0.0	**8.8**
	Less than 1 year	% of Total	0.4	0.2	1.1	0.6	0.0	**2.3**
	1 year	% of Total	0.8	0.6	1.2	0.0	1.8	**4.4**
LES	2 years	% of Total	5.0	2.3	0.0	0.2	0.0	**7.5**
	3 years	% of Total	31.1	3.3	4.4	7.2	1.1	**47.0**
	More than 3 years	% of Total	11.7	3.4	2.6	9.3	2.8	**29.8**
	% of total		**49.6**	**12.0**	**14.2**	**18.5**	**5.7**	**100**
	No teacher training	% of Total		0.0	0.0	6.3		**6.3**
	Less than 1 year	% of Total		0.0	5.0	15.8		**20.8**
	1 year	% of Total		0.0	11.0	11.3		**22.3**
	2 years	% of Total		0.8	5.0	1.0		**6.8**
MAL	3 years	% of Total		0.0	1.8	1.3		**3.0**
	More than 3 years	% of Total		1.5	40.6	57.9		**100**
	% of total			**1.5**	**40.6**	**57.9**		**100**
	No teacher training	% of Total	0.0	0.0	0.0	0.0	0.3	**0.3**
	Less than 1 year	% of Total	0.3	0.0	0.3	0.3	0.0	**0.8**
	1 year	% of Total	0.0	1.3	7.5	2.0	0.3	**11.0**
MAU	2 years	% of Total	0.0	0.3	35.8	29.3	1.8	**67.0**
	3 years	% of Total	0.0	0.0	3.0	3.5	0.0	**6.5**
	More than 3 years	% of Total	0.0	0.0	6.8	7.5	0.3	**14.5**
	% of total		**0.3**	**1.5**	**53.3**	**42.5**	**2.5**	**100**
	No teacher training	% of Total	0.0	2.6	17.9	1.5	0.0	**22.0**
	Less than 1 year	% of Total	1.0	0.5	11.5	1.3	0.0	**14.3**
	1 year	% of Total	0.3	1.5	1.3	.3	0.0	**3.3**
MOZ	2 years	% of Total	0.5	5.1	17.4	.0	0.0	**23.0**
	3 years	% of Total	1.8	5.6	21.7	1.8	0.0	**30.9**
	More than 3 years	% of Total	0.5	1.8	3.3	0.5	0.3	**6.4**
	% of total		**4.1**	**17.1**	**73.1**	**5.4**	**0.3**	**100**

Table 6.12 (Continued)

COUN-TRY	Teacher Qualification	Professional	READING TEACHERS' ACADEMIC QUALIFICATIONS Primary	Jun Sec.	Sen. Sec.	A-level	Tertiary	Total
	No teacher training	% of Total	0.3	0.0	1.8	0.0	1.5	**3.5**
	Less than 1 year	% of Total	0.5	0.5	0.5	0.3	0.5	**2.3**
NAM	1 year	% of Total	0.0	0.8	2.5	1.0	0.0	**4.3**
	2 years	% of Total	7.3	4.0	11.5	3.3	0.3	**26.3**
	3 years	% of Total	5.0	3.5	22.8	10.8	2.8	**44.9**
	More than 3 years	% of Total	0.5	0.3	7.5	2.5	8.0	**18.8**
	% of total		**13.5**	**9.0**	**46.6**	**17.8**	**13.0**	**100**
	No teacher training	% of Total	.0	.0	.0	.5	.0	**.5**
	Less than 1 year	% of Total	.0	.0	2.8	.0	.0	**2.8**
	1 year	% of Total	.0	.5	2.0	2.8	.0	**5.3**
SEY	2 years	% of Total	.0	6.5	14.6	3.5	1.3	**25.9**
	3 years	% of Total	1.3	.0	8.3	18.8	1.8	**30.2**
	More than 3 years	% of Total	.0	.0	4.5	27.9	3.0	**35.4**
	% of total		**1.3**	**7.0**	**32.2**	**53.5**	**6.0**	**100**
	No teacher training	% of Total	.0	.0	.0	.0	.5	**.5**
	1 year	% of Total	1.3	.0	.8	.0	.5	**2.6**
SOU	2 years	% of Total	7.0	1.8	4.1	2.1	1.0	**16.0**
	3 years	% of Total	13.7	1.8	7.8	9.6	9.8	**42.6**
	More than 3 years	% of Total	5.2	1.0	5.9	12.4	13.7	**38.2**
	% of total		**27.1**	**4.7**	**18.6**	**24.0**	**25.6**	**100**
	No teacher training	% of Total	.0	.0	2.3	.6	.0	**2.9**
	Less than 1 year	% of Total	.0	.0	.7	.0	.0	**.7**
	1 year	% of Total	.7	.0	.0	.2	.6	**1.5**
SWA	2 years	% of Total	1.3	3.4	3.7	22.8	.0	**31.3**
	3 years	% of Total	6.8	.0	5.5	35.4	6.4	**54.1**
	More than 3 years	% of Total	.0	.0	.7	3.7	5.2	**9.6**
	% of total		**8.7**	**3.4**	**12.8**	**62.8**	**12.3**	**100**
	Less than 1 year	% of Total	.0	1.3	.0	.0	.0	**1.3**
	1 year	% of Total	1.0	3.4	.0	.0	.0	**4.4**
	2 years	% of Total	10.8	53.0	.9	2.2	.7	**67.6**
TAN	3 years	% of Total	13.2	10.6	.0	.1	.0	**23.9**
	More than 3 years	% of Total	1.7	1.1	.0	.0	.0	**2.9**
	% of total		**26.8**	**69.4**	**.9**	**2.2**	**.7**	**100**
	No teacher training	% of Total	.0	.0	1.6	2.6	.0	**4.1**
	Less than 1 year	% of Total	.0	1.0	2.6	.8	.0	**4.4**
UGA	1 year	% of Total	.0	.0	2.1	1.3	.0	**3.4**
	2 years	% of Total	3.6	.0	33.6	17.8	1.6	**56.6**
	3 years	% of Total	.0	.0	7.8	4.9	.0	**12.7**
	More than 3 years	% of Total	.8	.5	7.8	8.5	1.3	**18.9**
	% of total		**4.4**	**1.6**	**55.3**	**35.9**	**2.8**	**100**
	No teacher training	% of Total	.0	.0	2.3	.0	.0	**2.3**
	Less than 1 year	% of Total	.0	.0	.8	.0	.0	**.8**
ZAM	1 year	% of Total	.3	.3	.8	.3	.0	**1.5**
	2 years	% of Total	10.1	5.7	66.8	9.0	.5	**92.0**
	3 years	% of Total	.0	.0	.3	1.0	.0	**1.3**
	More than 3 years	% of Total	.0	.0	1.0	1.0	.0	**2.1**
	% of total		**10.3**	**5.9**	**71.9**	**11.3**	**.5**	**100**
	No teacher training	% of Total	.0	2.6	3.6	.5		**6.7**
	Less than 1 year	% of Total	.0	.8	11.8	.0		**12.6**
	1 year	% of Total	.8	.5	5.4	.5		**7.2**
ZAN	2 years	% of Total	.0	3.1	62.3	5.9		**71.3**
	3 years	% of Total	.0	.0	.3	.0		**.3**
	More than 3 years	% of Total	.0	.5	.5	1.0		**2.1**
	% of total		**.8**	**7.4**	**83.8**	**7.9**		**100**
	No teacher training	% of Total	.0	.6	3.3	.6	.2	**4.7**
	Less than 1 year	% of Total	.2	.7	3.5	.3	.0	**4.7**
	1 year	% of Total	.4	1.5	2.6	.6	.2	**5.3**
SAC	2 years	% of Total	3.9	10.7	25.4	8.1	.7	**48.8**
	3 years	% of Total	5.3	2.3	6.6	6.9	1.6	**22.7**
	More than 3 years	% of Total	1.5	.9	3.2	5.3	2.9	**13.8**
	% of TOTAL		**11.3**	**16.6**	**44.7**	**21.8**	**5.6**	**100**

Source: Data from SACMEQ II database, 2004

As previously stated, almost half of the reading teachers within SACMEQ countries had a senior secondary qualification (45%) and two years of professional training (49%). It can therefore be observed that in 7 out of the 14 systems of education within SACMEQ countries reading teachers had on average 2 years of professional training (Botswana, Kenya, Mauritius, Tanzania, Uganda, Zambia and Zanzibar). In 5 systems of education more than 30% of the reading teachers had 3 years of professional training (Lesotho, Mozambique, Namibia, South Africa and Swaziland). However, one out of every 5 reading teachers in Malawi had only one year of training. In contrast, 35% of Seychellois reading teachers had more than 3 years of professional training. Finally, the percentage of reading teachers without any training varies from 0.3% in Mauritius to 22% in Mozambique.

Furthermore, the academic level of reading teachers varies greatly from primary to tertiary education. However, in the majority of reading teachers in (9 out 14 systems of education) had completed senior secondary and A-level education (Kenya, Malawi, Mauritius, Namibia, Seychelles, Swaziland, Uganda, Zambia and Zanzibar). Only two systems of education (Botswana and Mozambique) had most of their reading teachers with only junior secondary or senior secondary. A significant percentage of teachers in Lesotho (50%) and South Africa (27%) were found to have only primary education. In contrast, the pupils also had teachers with A-levels (Lesotho 19%) and education at tertiary level (South Africa 26%). An exception was Tanzania, in that 27% of its teachers had completed primary education and 70% junior secondary (see Appendix 10 for full explanation).

The next section presents and discusses the percentages for professional training and the academic level of mathematics teachers in Mozambique and in SACMEQ countries as a whole as well as in each SACMEQ country.

6.1.8 Teachers' Academic and Professional Qualification in Mathematics in Mozambique

Table 6.13 presents teachers' academic and professional qualification in mathematics in Mozambique.

Table 6.13

Percentages for professional training and academic level of mathematics teachers in Mozambique

			MATH TEACHERS' ACADEMIC QUALIF.				
			Prim.	**Jun. sec**	**Sen. Sec.**	**A-lev.**	**Total**
T/QUA -PROF	**No teacher training**	Count (No of teachers)	1	6	64	0	71
		% within t/qual-prof	1.4	8.5	90.1	.0	100
		% within t/qualify-aca	10.0	8.7	21.1	.0	18.3
		% of total	**.3**	**1.6**	**16.5**	**.0**	**18.3**
	less than one year	Count (No of teachers)	0	6	35	2	43
		% within t/qual-prof	.0	14.0	81.4	4.7	100
		% within t/qualify-aca	.0	8.7	11.5	50.0	11.1
		% of total	**.0**	**1.6**	**9.0**	**.5**	**11.1**
	one year	Count (No of teachers)	0	10	4	0	14
		% within t/qual-prof	.0	71.4	28.6	.0	100
		% within t/qualify-aca	.0	14.5	1.3	.0	3.6
		% of total	**.0**	**2.6**	**1.0**	**.0**	**3.6**
	two years	Count (No of teachers)	6	21	70	0	97
		% within t/qual-prof	6.2	21.6	72.2	.0	100
		% within t/qualify-aca	60.0	30.4	23.0	.0	25.1
		% of total	**1.6**	**5.4**	**18.1**	**.0**	**25.1**
	three years	Count (No of teachers)	3	21	120	2	146
		% within t/qual-prof	2.1	14.4	82.2	1.4	100
		% within t/qualify-aca	30.0	30.4	39.5	50.0	37.7
		% of total	**.8**	**5.4**	**31.0**	**.5**	**37.7**
	More than three years	Count (No of teachers)	0	5	11	0	16
		% within t/qual-prof	.0	31.3	68.8	.0	100
		% within t/qualify-aca	.0	7.2	3.6	.0	4.1
		% of total	**.0**	**1.3**	**2.8**	**.0**	**4.1**
TOTAL		Count (No of teachers)	10	69	304	4	387
		% within t/qualprof	2.6	17.8	78.6	1.0	100
		% within t/qual-aca	100.0	100.0	100.0	100.0	100
		% of TOTAL	**2.6**	**17.8**	**78.6**	**1.0**	100

Source: Data from SACMEQ II database, 2004

Table 6.13 shows that 18% of teachers in Grade 6 had no professional training, with the majority (38%) having had three years of professional training and just 4% having more than three years of professional training.

Cross tabulation results also show that the majority (78.6%) of mathematics teachers in Grade 6 in Mozambique had achieved a senior secondary academic level in which almost a third (31%) had 3 years of professional training, but almost 17% had no professional training at all. At one end of the scale, a mere 1% had A-level and at the other end, 2.6% of Mozambican teacher had only primary education.

6.1.9 Teachers' Academic and Professional Qualification in Mathematics in SACMEQ countries

Table 6.14 shows the percentages for professional training and the academic level of mathematics teachers in SACMEQ countries.

Table 6.14

Percentages for professional training and academic level of mathematics teachers in SACMEQ countries

			TEACHERS' ACADEMIC QUALIFICATIONS					
			Prim.	**Jun. sec**	**Sen. Sec.**	**A-lev.**	**Tert.**	**Total**
T/QUA -PROF	**No teacher training**	Count (No of teachers)	0 1	28	197	20	13	259
		% within t/qual-prof	0.4	10.8	76.1	7.7	5.0	100
		% within t/qualif-aca	0.2	3.1	7.9	1.7	4.6	4.8
		% of total	**0.0**	**0.5**	**3.6**	**0.4**	**0.2**	**4.8**
	less than one year	Count (No of teachers)	07	40	140	11	05	203
		% within t/qual-prof	3.4	19.7	69.0	5.4	2.5	100
		% within t/qualif-aca	1.3	4.4	5.6	.9	1.8	3.8
		% of total	**0.1**	**0.7**	**2.6**	**0.2**	**0.1**	**3.8**
	one year	Count (No of teachers)	18	66	124	22	06	236
		% within t/qual-prof	7.6	28.0	52.5	9.3	2.5	100
		% within t/qualif-aca	3.3	7.3	5.0	1.8	2.1	4.4
		% of total	**0.3**	**1.2**	**2.3**	**0.4**	**0.1**	**4.4**
	two years	Count (No of teachers)	195	602	1451	423	32	2 703
		% within t/qual-prof	7.2	22.3	53.7	15.6	1.2	100
		% within t/qualif-aca	35.5	66.8	58.5	35.4	11.3	50.0
		% of total	**3.6**	**11.1**	**26.8**	**7.8**	**0.6**	**50.0**
	three years	Count (No of teachers)	254	108	400	369	88	1 219
		% within t/qual-prof	20.8	8.9	32.8	30.3	7.2	100
		% within t/qualif-aca	46.2	12.0	16.1	30.9	31.2	22.5
		% of total	**4.7%**	**2.0**	**7.4**	**6.8**	**1.6**	**22.5**
	More than three years	Count (No of teachers)	75	57	167	351	138	788
		% within t/qual-prof	9.5	7.2	21.2	44.5	17.5	100
		% within t/qualif-aca	13.6	6.3	6.7	29.3	48.9	14.6
		% of total	**1.4**	**1.1**	**3.1**	**6.5**	**2.6**	**14.6**
TOTAL		Count (No of teachers)	550	901	2479	1196	282	5408
		% within t/qualprof	10.2	16.7	45.8	22.1	5.2	100
		% within t/qual-aca	100	100	100	100	100	100
		% of TOTAL	**10.2**	**16.7**	**45.8**	**22.1**	**5.2**	**100**

Source: Data from SACMEQ II database (2004)

Table 6.14 shows that the majority (46%) of mathematics teachers had senior secondary level education. Only 5% of Grade 6 mathematics teachers had tertiary education and 22% had A-levels, whilst 10% had only primary education.

In SACMEQ countries, 5% of mathematics teachers had no professional training at all, 4% had one year or less, the majority of teachers (50%) had two years of professional training, and 23% had three years or more of professional training.

These results are further broken down and examined in more depth, country by country. Table 6.15 presents the results of cross-tabulations in each SACMEQ country in mathematics.

6.1.10 Teachers' Academic and Professional Qualification in Mathematics in each SACMEQ country

Table 6.15 shows the percentages for professional training and the academic level of teachers in mathematics each SACMEQ countries.

Table 6.15

Percentages for professional training and academic level of mathematics teachers in each SACMEQ country

			MATH TEACHERS' ACADEMIC QUALIFICATIONS					
COUN-TRY	**Teacher Professional**	**Qualification-**	**Primary**	**Jun Sec.**	**Sen.Sec.**	**A-level**	**Tertiary**	**Total**
	No teacher training	% of Total	.0	.3	4.3	.0	.0	**4.5**
	Less than 1 year	% of Total	.0	.8	.3	.0	.0	**1.0**
	2 years	% of Total	6.8	42.8	18.8	4.0	1.5	**73.8**
BOT	3 years	% of Total	.5	2.0	4.0	3.8	.8	**11.0**
	More than 3 years	% of Total	.5	1.5	3.0	.8	4.0	**9.8**
	% of total		**7.8**	**47.3**	**30.3**	**8.5**	**6.3**	**100**
	No teacher training	% of Total		.0	2.1	.0	.0	**2.1**
	Less than 1 year	% of Total		.0	.8	.3	.0	**1.0**
	1 year	% of Total		.0	.3	.0	.0	**.3**
KEN	2 years	% of Total		1.8	67.9	16.3	.3	**86.3**
	3 years	% of Total		.5	5.7	.0	.0	**6.2**
	More than 3 years	% of Total		.0	3.6	.5	.0	**4.1**
	% of total			**2.3**	**80.3**	**17.1**	**.3**	**100**
	No teacher training	% of Total	.5	2.2	5.4	1.2	.0	**9.4**
	Less than 1 year	% of Total	.4	.2	.6	.6	.0	**1.8**
	1 year	% of Total	.8	.6	1.2	.0	1.8	**4.4**
LES	2 years	% of Total	5.0	2.3	.0	.2	.0	**7.5**
	3 years	% of Total	30.5	3.3	5.4	7.2	1.6	**48.1**
	More than 3 years	% of Total	12.2	2.9	2.2	8.7	2.8	**28.8**
	% of total		**49.6**	**11.4**	**14.8**	**17.9**	**6.2**	**100**
	No teacher training	% of Total		1.8	8.0	.0		**9.8**
	Less than 1 year	% of Total		4.7	17.6	.0		**22.2**
	1 year	% of Total		8.3	11.9	.0		**20.2**
	2 years	% of Total		11.6	23.8	.5		**35.9**
MAL	3 years	% of Total		2.6	4.7	.0		**7.2**
	More than 3 years	% of Total		1.6	3.1	.0		**4.7**
	% of total			**30.5**	**69.0**	**.5**		**100**
	No teacher training	% of Total	.0	.0	.0	.0	.3	**.3**
	Less than 1 year	% of Total	.3	.0	.3	.3	.0	**.8**
	1 year	% of Total	.0	1.3	7.5	2.0	.3	**11.0**
MAU	2 years	% of Total	.0	.3	35.8	29.3	1.8	**67.0**
	3 years	% of Total	.0	.0	3.0	3.5	.0	**6.5**
	More than 3 years	% of Total	1	6	**213**	170	10	**400**
	% of total		**.3**	**1.5**	**53.3**	**42.5**	**2.5**	**100**
	No teacher training	% of Total	.3	1.6	16.5	.0		**18.3**
	Less than 1 year	% of Total	.0	1.6	9.0	.5		**11.1**
	1 year	% of Total	.0	2.6	1.0	.0		**3.6**
MOZ	2 years	% of Total	1.6	5.4	18.1	.0		**25.1**
	3 years	% of Total	.8	5.4	31.0	.5		**37.7**
	More than 3 years	% of Total	.0	1.3	2.8	.0		**4.1**
	% of total		**2.6**	**17.8**	**78.6**	**1.0**		**100.0**

Table 6.15 (Continued)

COUN-TRY	Teacher Professional	Qualification-	MATH TEACHERS' ACADEMIC QUALIFICATIONS Primary	Jun Sec.	Sen.Sec.	A-level	Tertiary	Total
NAM	No teacher training	% of Total	.0	.3	1.3	.3	.8	**2.5**
	Less than 1 year	% of Total	.8	.3	.3	.3	.8	**2.3**
	1 year	% of Total	1.0	.3	3.5	.0	.3	**5.0**
	2 years	% of Total	11.3	1.5	14.3	2.8	.0	**29.8**
	3 years	% of Total	4.3	5.5	19.0	12.5	3.0	**44.3**
	More than 3 years	% of Total	.5%	.8%	7.5%	2.0%	5.5%	**16.3%**
	% of total		**17.8**	**8.5**	**45.8**	**17.8**	**10.3**	**100.0**
SEY	No teacher training	% of Total		.0	1.0	.0	.0	**1.0**
	2 years	% of Total		2.2	7.7	9.2	.0	**19.2**
	3 years	% of Total		.0	5.2	14.7	3.5	**23.4**
	More than 3 years	% of Total		.0	4.7	51.7	.0	**56.5**
	% of total			**2.2**	**18.7**	**75.6**	**3.5**	**100**
SOU	No teacher training	% of Total	.0	.0	.3	.0	.5	**.8**
	1 year	% of Total	1.3	.0	.0	.0	.0	**1.3**
	2 years	% of Total	9.0	.5	3.4	1.9	.3	**15.1**
	3 years	% of Total	18.3	.5	9.5	6.9	9.8	**45.0**
	More than 3 years	% of Total	4.5	1.6	5.6	9.5	16.7	**37.8**
	% of total		**33.1**	**2.6**	**18.8**	**18.3**	**27.2**	**100**
SWA	No teacher training	% of Total	.0	.0	3.6	.8	.6	**5.1**
	1 year	% of Total	.6	.0	.6	1.3	.0	**2.5**
	2 years	% of Total	2.5	1.4	8.2	21.4	1.9	**35.3**
	3 years	% of Total	6.0	.0	3.6	37.2	5.0	**51.9**
	More than 3 years	% of Total	.0	.0	.0	1.8	3.4	**5.2**
	% of total		**9.2**	**1.4**	**16.0**	**62.6**	**10.9**	**100**
TAN	No teacher training	% of Total	.0	.0	.0	.1		**.1**
	1 year	% of Total	.0	3.5	.0	.0		**3.5**
	2 years	% of Total	2.6	69.6	2.9	1.0		**76.0**
	3 years	% of Total	6.1	9.4	.0	.0		**15.5**
	More than 3 years	% of Total	.0	3.8	.0	1.1		**4.9**
	% of total		**8.7**	**86.2**	**2.9**	**2.2**		**100**
UGA	No teacher training	% of Total	.0	.7	1.0	.7	1.3	**3.7**
	Less than 1 year	% of Total	.0	.0	2.4	.0	1.0	**3.4**
	1 year	% of Total	.0	.0	.0	2.0	.0	**2.0**
	2 years	% of Total	.0	.0	43.8	13.1	1.0	**57.9**
	3 years	% of Total	.0	.0	13.1	7.4	.0	**20.5**
	More than 3 years	% of Total	.3	.0	2.4	6.4	3.4	**12.5**
	% of total		**.3**	**.7**	**62.6**	**29.6**	**6.7**	**100**
ZAM	No teacher training	% of Total	.0	.0	2.3	.0	.0	**2.3**
	Less than 1 year	% of Total	.0	.0	.8	.0	.0	**.8**
	1 year	% of Total	.3	.3	.8	.3	.0	**1.5**
	2 years	% of Total	9.2	5.9	66.2	9.7	.5	**91.6**
	3 years	% of Total	.0	.0	.3	1.0	.0	**1.3**
	More than 3 years	% of Total	.0	.0	1.0	1.5	.0	**2.6**
	% of total		**9.5**	**6.1**	**71.4**	**12.5**	**.5**	**100**
ZAN	No teacher training	% of Total	.0	.0	4.1	1.8		**6.0**
	Less than 1 year	% of Total	.0	2.8	4.7	.3		**7.8**
	1 year	% of Total	.5	.3	4.1	.3		**5.2**
	2 years	% of Total	.0	5.4	69.2	3.4		**78.0**
	3 years	% of Total	.3	.0	.5	.3		**1.0**
	More than 3 years	% of Total	.0	1.0	.8	.3		**2.1**
	% of total		**.8**	**9.6**	**83.4**	**6.2**		**100**
SAC	No teacher training	% of Total	.0	.5	3.6	.4	.2	**4.8**
	Less than 1 year	% of Total	.1	.7	2.6	.2	.1	**3.8**
	1 year	% of Total	.3	1.2	2.3	.4	.1	**4.4**
	2 years	% of Total	3.6	11.1	26.8	7.8	.6	**50.0**
	3 years	% of Total	4.7	2.0	7.4	6.8	1.6	**22.5**
	More than 3 years	% of Total	1.4	1.1	3.1	6.5	2.6	**14.6**
	% of TOTAL		**10.2**	**16.7**	**45.8**	**22.1**	**5.2**	**100**

Source: Data from SACMEQ II database, 2004

As previously observed, almost half of the mathematics teachers in SACMEQ countries had senior secondary education (46%) and two years of professional training (50%). In 8 out of 14 systems of education, almost two thirds (71%) of the mathematics teachers had on average only 2 years of professional training (Botswana, Kenya, Malawi, Mauritius, Tanzania, Uganda, Zambia, and Zanzibar). In 5 systems of education, fewer than half of the mathematics teachers had 3 years of professional training (Lesotho, Mozambique, Namibia, South Africa and Swaziland). It is noteworthy that over half (57%) of the mathematics teachers in the Seychellois system had more than 3 years of professional training. Finally, the percentage of teachers without any training varies from 0.1% in Tanzania and Mauritius to 18% in Mozambique.

In addition, the academic level of the teachers varies from primary to tertiary education in the SACMEQ countries. However, half of the systems (7 out 14) had teachers who had completed senior secondary and A-level academic levels of education (Kenya, Mauritius, Namibia, Seychelles, Swaziland, Uganda and Zambia). The majority of the mathematics teachers in four systems of education (Botswana, Malawi, Mozambique and Zanzibar) had junior secondary or senior secondary education. The majority of the mathematics teachers in Lesotho (50%) and South Africa (33%) had primary education, but at the other end of the scale, almost 18% of Lesotho's mathematics teachers had completed A-level education and 27% of South African mathematics teachers had a tertiary level qualification. As with the pattern for teachers of reading, 9% of Tanzania's mathematics teachers had completed only primary education, and 86.2% junior secondary (see appendix 11 for more details).

6.2 PUPIL CHARACTERISTICS AND BACKGROUND

Pupils' backgrounds and the problems they encounter in Mozambique and other SACMEQ countries are presented and discussed in the next section.

6.2.1 Characteristics and Problems of Pupils in Mozambique

Many factors affect pupil performance, such as the quality of teachers, the condition of schools, and the pupils' background, to mention a few. Table 6.16 attempts to illustrate the characteristics of Grade 6 Mozambican pupils during 2000 by taking into account age, gender, the number of books at home, possessions at home, meals, and parental education.

Table 6.16

Means, percentages, and sampling errors for pupil age, sex, and home-related characteristics

Provinces	Age (months)		Sex (female)		Books at home (number)		Possessions at home (index)		Meals (index)		Parent education (index)	
	Mean	SE	%	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
CAB	199.8	2.56	26.8	3.48	25.3	8.03	2.7	0.28	10.8	0.15	5.7	0.24
GAZ	177.5	2.04	49.2	3.22	29.6	14.38	3.6	0.33	10.8	0.18	6.0	0.26
INH	176.0	1.79	43.7	4.38	19.0	7.01	3.5	0.33	10.9	0.16	5.4	0.19
MAC	170.9	1.46	48.8	2.93	29.8	4.22	5.1	0.16	10.3	0.17	6.6	0.13
MAN	177.7	1.75	33.5	3.74	12.2	1.99	4.2	0.29	11.2	0.10	5.7	0.24
MAP	172.3	2.45	54.1	3.43	29.3	6.80	5.4	0.30	10.8	0.17	6.4	0.22
NAM	180.1	1.26	29.5	2.98	19.9	4.06	3.2	0.22	10.9	0.11	5.5	0.26
NIA	183.1	2.80	31.9	3.99	22.8	4.58	3.7	0.24	11.0	0.16	5.9	0.26
SOF	171.9	2.15	34.5	4.15	38.1	6.76	4.1	0.32	10.0	0.22	5.9	0.22
TET	174.6	2.02	38.3	3.90	18.8	3.99	3.6	0.29	10.2	0.18	5.5	0.29
ZAM	180.0	2.34	32.0	3.52	22.1	4.82	3.1	0.30	10.2	0.21	5.4	0.22
Mozambique	176.7	0.63	40.3	1.16	24.9	2.13	4.0	0.08	10.6	0.06	5.9	0.07

Source: SACMEQ II database 2004

Age

The mean age of Mozambican pupils in Grade 6 in 2000 was 176.7 months (14.7 years). The official age of entry into schooling in Mozambique is 6 years. That is, pupils enter school in January in the year they will turn 6 years old before 31 December. The expected age of a Grade 6 pupil should be 132 months (11 years), but the average age of the pupils in the study was 4 years older than expected. There were also large variations among the regions. For instance, Cabo Delgado had the oldest pupils at an average of 199.8 months (almost 16.7 years) and Maputo Cidade the youngest at 170.9 months (14.2 years). The high numbers of over-age pupils were due to a combination of factors such as the high levels of grade repetition and late entry into the first grade. The Ministry of Education and Culture has initiated an attempt to reduce the repetition and dropout rate by introducing a new curriculum in 2004 and revitalizing the School Clusters known as “Zona de influencia pedagogica (ZIPs)” to support teachers in their practice and improve their professional performance.

Gender

Table 6.16 indicates that the percentage of girls in Grade 6 was 40% in 2000. There was a large variation between provinces, ranging from 27% in Cabo Delgado to 54% in Maputo Provincia. The northern provinces of Nampula, Niassa and Cabo Delgado had the lowest percentage of girls in Grade 6, whereas the southern provinces of Inhambane, Gaza, Maputo Provincia (54.1%) and Maputo Cidade showed percentages that were above the average. Apart from the cultural aspects related to girls' education, parents tend to give priority to boys' being educated rather than girls. Other factors such as the absence of upper primary schools near many communities also have an impact on children's education. For pupils in such communities to continue their studies in upper primary schools they have to move to nearby villages and board with other families, or live in hostels (SACMEQ II). This practice tends to be necessary in the Northern provinces of Mozambique and there are fewer girls who continue with further education as a result. More often than not, parents are unwilling to send their girl children to hostels, since the conditions in most hostels are adverse. Some pupils live in hostels in Cabo Delgado (38%), Niassa (16%) and Nampula (11%), but in general hostel buildings are in poor condition, the sanitation is inadequate, they are overcrowded, the diet is meagre, and they are not well supervised (Passos, Nahara, Magaia and Lauchande, 2005).

To reduce the gender imbalance in education, the Ministry of Education has introduced policies such as scholarships for girls and the upgrading of the lower primary schools (Grades 1 – 5) to complete primary schools (Grades 1 – 7). This improvement ensures that pupils do not need to leave their villages to move to towns in order to attend upper primary school. Upgrading allows for the completion of primary school (lower and upper primary) and is the best available way of reducing the gender imbalance.

Socio-Economic Status (SES)

The socio-economic status of the pupils is usually highlighted as a factor to take into consideration with pupil performance. Because it is impossible to ask the children about their parents' salaries, indirect methods of assessing the wealth of the home were used. One component introduced was home possessions. Another was the intellectual milieu as characterized by the level of education of the parents and the number of books they have at home, particularly as both can be of use to the child's learning.

Books in the home

The information summarized in Table 6.16 shows that the average Grade 6 pupil had 30 books at home. The variation in the provinces ranges from a low of 12 books for Manica to a high of 38 books for Sofala. It is essential for pupils to be able to read at home to improve their reading skills, and it is therefore disappointing to learn that some pupils had few books at home or at school.

If there are few books in the home, then the Ministry may wish to overcome this deficit by ensuring that children can take library books home from school to read, and the Ministry can also provide mobile libraries that visit villages at least once every two weeks (Passos, Nahara, Magaia and Lauchande, 2005, p.32).

Index of possessions

Several items were selected to indicate the socio-economic status (SES) of pupils in Mozambique. The pupil questionnaire asked about thirteen items that they might possess in the home. These items included a daily newspaper, a weekly or monthly magazine, a radio, a TV set, a video cassette recorder (VCR), a cassette player, a telephone, a car, a motorcycle, a bicycle, piped water, electricity (mains, generator, solar), and a table to write on.

The various items were grouped under categories with a specific score provided for each category. The lowest score possible was zero if a pupil did not have any item on the list, and the highest was 13. The average number of possessions for pupils was 4, and the same average applied to both reading teachers (4.0) and mathematics teachers (3.9) and roughly one third of the highest number (13). Maputo Provincia was the highest with 5.4 possessions, and Cabo Delgado was the lowest with 2.7 possessions. The provinces of Maputo Cidade, Manica, Maputo Provincia and Sofala were above the average, whereas the rest of provinces were below the average.

Nutrition

As indicated in Table 6.16, questions concerning the nutrition of the pupils in terms of their having three meals a day (a morning meal, a mid-day meal and an evening meal) were included in the pupil questionnaire to establish how many times a week they ate. No questions were asked about the nutritional value of each meal. The lowest score possible was 3, which meant that they did not eat at all, and the highest possible score was 12, which indicated that they ate every meal each day. The results summarized in Table 6.16 show that the average was 10.6 meals, which indicated that Grade 6 pupils in Mozambique had enough to eat. The average in Sofala was the lowest in the country (10.0 meals), with Maputo Cidade also recording a low of 10.3 meals, which falls below the average. Manica and Niassa had the highest scores of 11.2 and 11.0 meals per week respectively.

Parental Education

Another variable influencing pupil performance is the level of parental education. Separate questions were asked about the mother’s and father’s education level, and the results are summarized in Table 6.16. A score of '0' indicated that neither parent had received any school education, and a score of 6 indicated that both parents had completed senior secondary and tertiary education. The parental education average was 5.9 in Mozambican Grade 6 schools. There was a small variation among the provinces. The highest score was 6.6 in Maputo Cidade, and the lowest was 5.4 in Inhambane, Tete, and Zambézia.

Pupils' homes

One of the ways to measure the quality of pupils' home is to assess the materials that are used in the construction of the homes and in particular the floors, walls and roofs of the houses where they live. SACMEQ constructed an index for the general quality of the Grade 6 pupils' homes from the sum of the indices for (a) lighting, (b) the condition of the floors, (c) the condition of the walls and (d) the condition of the roof. For each of the factors (a) to (d), the minimum value of the index was 1 for absolutely basic or poor condition, and the maximum was 4 if the condition was perfect. Therefore, the minimum value of the index for general quality was 4 if all of the factors were absolutely basic or poor, and the maximum was 16 if all the aspects were perfect. Table 6.17 shows the general quality of pupils' home.

Table 6.17

Means and sampling errors for the general quality of pupils' homes

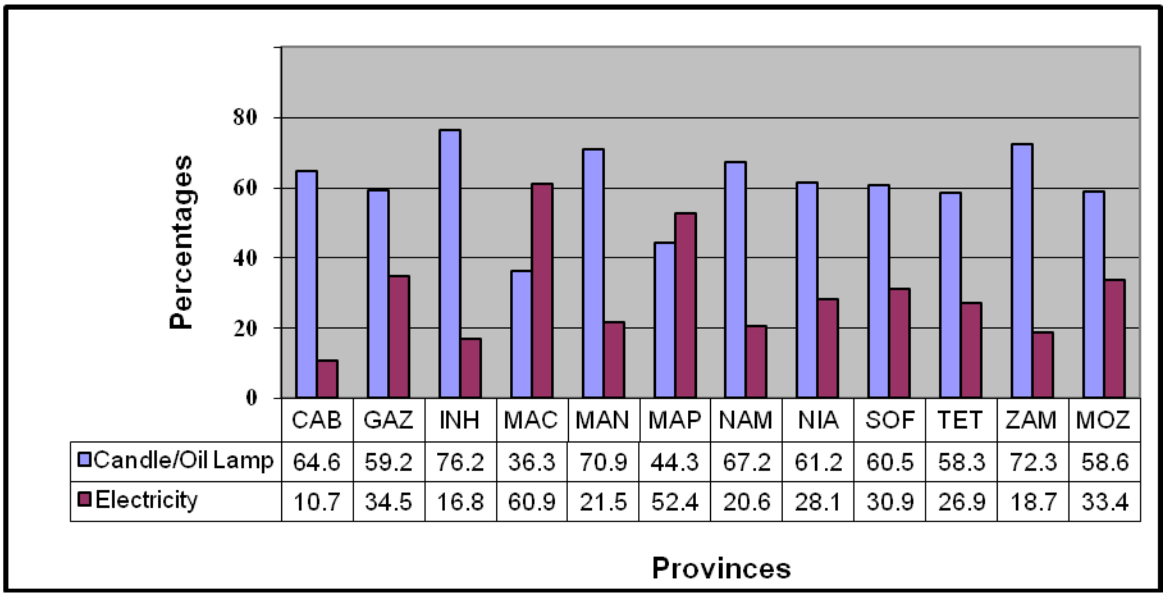
Provinces	**General quality of pupil's homes (index)**	
	Mean	**SE**
CAB	8.3	0.26
GAZ	9.6	0.32
INH	8.1	0.46
MAC	11.7	0.23
MAN	8.6	0.33
MAP	11.8	0.24
NAM	8.3	0.38
NIA	8.2	0.28
SOF	9.3	0.47
TET	8.4	0.44
ZAM	7.4	0.45
MOZ	**9.4**	**0.12**

Source: SACMEQ II database, 2004

It can be observed in Table 6.17 that in terms of the average, the general quality of Mozambican pupils' homes in Grade 6 was 9.4. There was some variation among provinces, ranging from 11.8 in Maputo Province to 7.4 in Zambézia. Maputo Province (11.8), Maputo Cidade (11.7) and Gaza (9.6) were the three provinces where the index of the quality of pupils' home was higher than the average. As stated in the SACMEQ report, the results reflect the imbalance in income distribution in Mozambique. This finding is consistent with that of the human development index (HDI) for Mozambique, where the index for Maputo Cidade in 2000 was 0.51 while that for Zambézia was 0.18 (UNDP, 2001).

Lighting

Another indicator of the socio-economic status is the type of lighting that the pupils use at home. The figure below shows the percentage of pupils that had candles/oil lamps or electricity in their homes (see Appendix 12).



	CAB	GAZ	INH	MAC	MAN	MAP	NAM	NIA	SOF	TET	ZAM	MOZ
Candle/Oil Lamp	64.6	59.2	76.2	36.3	70.9	44.3	67.2	61.2	60.5	58.3	72.3	58.6
Electricity	10.7	34.5	16.8	60.9	21.5	52.4	20.6	28.1	30.9	26.9	18.7	33.4

Source: Data from SACMEQ database, 2004

Figure 6. 5 Percentage of pupils that had candles/oil lamps or electricity at home

Figure 6.5 demonstrates that most pupils in upper primary school in Mozambique do not have electricity at home. An average 33% and 59% of pupils had electricity and candles/oil lamps, respectively, as a source of lighting in their homes. There was a large variation in the provinces in the proportion of pupils that used electricity as a source of lighting, ranging from 11% in Cabo Delgado to 61% in Maputo Cidade as well as a variation ranging from 36% in Maputo Cidade to 76% in Inhambane of pupils that used candles/oil lamps.

Location of school

Seventy-five percent of the Mozambican Grade 6 pupils were attending an urban school in 2000, as most Grade 6 and 7 schools were located in urban areas.

Language spoken at home

One of the factors to take into consideration in pupil performance is how often pupils speak the language of instruction at home. In Mozambique the language of instruction is Portuguese. Pupils' proficiency in the language is related to how often they speak the language. The percentage of pupils who spoke Portuguese at home is presented in Table 6.18 in terms of 'sometimes,' 'often' and 'all of the time'.

Table 6.18 reflects the fact that an average of 95% of the pupils spoke Portuguese at home at least sometimes. The variation among provinces ranged from 84% in Niassa to 98% in Maputo Provincia. This percentage meant that 16% of the pupils in Niassa and 2% of the pupils in Maputo Provincia never spoke Portuguese at home. Maputo Provincia, Maputo Cidade, Manica and Inhambane were provinces where the percentage of pupils that spoke Portuguese at home was higher than the average. Mozambique is a multilingual country and has, according to Sitoe and Ngunga (2000), 18 Bantu languages, each of which has many dialects. Taking into consideration that Portuguese is a second language for the majority of the pupils in Grade 6, the percentage of pupils that spoke Portuguese, at least sometimes at home, is very high. The location of upper primary school in urban areas and the fact that Portuguese is the language of instruction in Mozambique from Grade 1 onwards may contribute to the high percentage of pupils speaking Portuguese at home.

Table 6.18

Percentages, mean, and sampling errors for language, days absent, and repetition

Provinces	**Speak Portuguese**		**Days absent**		**Repetition**	
	%	**SE**	**Mean**	**SE**	**%**	**SE**
CAB	93.9	1.85	3.0	0.22	65.3	2.73
GAZ	93.8	1.85	2.5	0.35	83.1	2.55
INH	94.9	1.77	1.5	0.27	83.6	3.25
MAC	97.5	1.10	2.8	0.26	85.3	2.34
MAN	97.4	1.75	2.9	0.28	78.9	2.72
MAP	98.4	0.62	2.5	0.26	83.9	2.81
NAM	93.3	2.01	3.4	0.38	70.9	3.17
NIA	83.9	2.92	4.0	0.27	68.8	3.47
SOF	93.6	1.64	2.8	0.27	69.3	4.33
TET	90.4	2.04	2.6	0.30	67.6	4.46
ZAM	92.7	1.40	3.0	0.26	79.2	2.72
MOZ	**94.5**	**0.50**	**2.7**	**0.10**	**78.2**	**0.98**

Source: SACMEQ database, 2004

Absenteeism and repetition

Another question related to pupil performance was the number of days that the pupils were absent during the month preceding the testing. Yet another was related to pupil repetition. Pupils were asked if they had repeated a grade at least once. Table 6.18 shows that Grade 6 pupils in Mozambique were absent for 2.7 days during the month preceding the testing. The variation among provinces ranged from 1.5 days in Inhambane to 4.0 in Niassa. Absenteeism can be seen as a problem in Niassa because 4 days represent more or less a week in one month. From these results one can conclude that a large number of days are lost every year. With the HIV pandemic rife in the region, the problem of absenteeism can be expected to increase. The SACMEQ study did not confirm the problem of HIV as the reason for absenteeism, but most of the absenteeism was declared as being related to illness and family reasons.

The repetition rate is very high in Mozambique, with 78% of the pupils having repeated a grade at least once. There were some variations among provinces, ranging from 65% in Cabo Delgado to 85% in Maputo Cidade. According to the SACMEQ report, this repetition rate may be related to the teachers' academic and professional qualifications.

Distance to school

Table 6.19 shows that the distance from home to school is an important factor to consider, as in Mozambique more that 60% of the population lives in rural areas. The country is large and in addition, it has a poor transport and communication network. Generally, the rural areas have poor access to basic services and infrastructure such as piped water, electricity and good roads. To find the average distance between home and school, the school director was asked about whether his or her school was located in an isolated area, a village, a small town or a city. The first two categories were combined and called 'rural' and the latter two categories were also combined and called 'urban.' A further question asked about how many kilometres it was from the school to a health clinic, a tarmac road, a public library, a bookshop and a secondary school, and these distances were averaged for each school.

The gross school enrolment ratio by level in 2000 was as follows:

Lower Primary school (Grades 1 to 5)	88.9%
Upper Primary school (Grades 6 and 7)	8.1%
Junior Secondary (Grades 8 to 10)	3.1%
Senior Secondary (Grades 11 and 12)	0.4%

To add to the picture of schooling in Mozambique, Table 6.19 illustrates the location of schools across provinces within the country.

Table 6.19

School location

Province	Urban		Distance (Km)	
	%	**SE**	**Mean**	**SE**
CAB	46.7	12.46	25.8	7.83
GAZ	71.1	12.61	9.5	4.21
INH	63.1	14.83	8.3	3.77
MAC	100.0	0.00	2.3	0.41
MAN	80.0	13.79	12.6	3.70
MAP	72.7	12.18	5.9	1.22
NAM	64.2	10.91	27.5	7.16
NIA	58.4	11.05	18.3	7.46
SOF	86.2	9.26	11.1	3.63
TET	58.6	11.44	23.4	9.42
ZAM	73.9	10.59	19.5	7.52
MOZ	**74.5**	**3.27**	**13.2**	**1.59**

Source: Passos, Nahara, Magaia and Lauchande, 2005, p.39

As can be seen in Table 6.19, most Grade 6 schools were located in urban areas. For instance, in 2000 75% of the Grade 6 pupils in Mozambique were in urban schools. Cabo Delgado was the only province where most of pupils were in rural schools. However, there is an ongoing programme by the Ministry of Education to expand access to the full cycle of basic education throughout the country. The average distance that a Grade 6 pupil has to walk to go to school is 13.2 km. There was a large variation among the provinces. In Maputo Cidade and Maputo provinces, the Grade 6 pupil travels 2.3 and 5.9 kilometres respectively, while in Nampula he or she needs to travel 27.5km. There is a huge imbalance among provinces in terms of school distribution. It seems that the further north you go, the greater the distance the Grade 6 pupil has to travel.

6.2.2 Characteristics and Problems of Pupils in SACMEQ Countries

The Mozambican pupils' background is compared with that of the pupils from other SACMEQ countries and then discussed in this section.

As explained in Section 6.2.1, several items were selected to indicate the pupils' socio-economic status. Table 6.20 shows the pupils' characteristics in Grade 6 in SACMEQ countries in 2000.

Table 6.20

Means, percentages, and sampling errors for the pupils' age, sex, and home-related background (SACMEQ II)

Country	Age (months)		Sex (female)		Books at home (number)		Possessions at home (index)		Meals (index)		Parent education (index)	
	Mean	SE	%	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Botswana	157.8	0.41	51.0	0.64	24.7	1.99	5.5	0.13	10.7	0.06	6.5	0.12
Kenya	168.4	0.76	50.3	1.19	27.6	3.25	4.3	0.14	11.2	0.06	7.4	0.13
Lesotho	169.6	0.70	55.6	0.93	16.3	1.38	4.2	0.11	10.7	0.09	6.1	0.08
Malawi	174.0	1.19	47.8	1.34	10.1	1.07	4.0	0.15	11.3	0.06	5.9	0.14
Mauritius	135.8	0.12	48.1	0.60	37.6	2.11	9.7	0.09	11.6	0.04	7.7	0.08
Mozambique	176.7	0.63	40.3	1.16	24.9	2.13	4.0	0.08	10.6	0.06	5.9	0.07
Namibia	166.4	0.57	51.9	0.61	22.0	1.16	5.4	0.10	10.7	0.06	6.9	0.08
Seychelles	138.8	0.12	50.1	1.30	44.6	1.58	8.9	0.05	10.3	0.05	8.7	0.05
South Africa	156.9	0.69	52.5	1.00	32.9	2.36	6.6	0.20	10.5	0.08	7.7	0.14
Swaziland	166.4	0.60	51.6	0.86	19.1	1.62	5.7	0.14	11.0	0.07	7.2	0.12
Tanzania	180.4	0.83	52.2	0.95	31.6	2.83	3.4	0.18	10.6	0.09	6.2	0.13
Uganda	171.4	0.93	44.5	1.63	31.6	2.62	3.4	0.11	9.9	0.11	6.4	0.11
Zambia	166.7	1.43	48.4	1.19	19.1	1.32	4.0	0.18	10.7	0.07	7.5	0.11
Zanzibar	179.1	0.42	51.7	1.23	10.8	0.97	4.6	0.06	11.2	0.04	6.0	0.06
SACMEQ	**164.8**		**49.7**		**25.2**		**5.26**		**10.7**		**6.86**	

Source: Data from SACMEQ II database, 2004

Age

The mean age of pupils in Grade 6 in SACMEQ countries in 2000 was 164.8 months (13.7 years). The variation between countries ranged from 180.4 months (15.0 years) in Tanzania to 135.8 months (11.3 years) in Mauritius. The age of pupils in Grade 6 in SACMEQ countries (ranging from 11.3 to 15 years) may make a difference in terms of pupil performance, taking into consideration the level of maturation of the pupils. In addition, if one considers the normal school entry age (6-7 years) in some countries, pupils were around 2 or 3 years older than expected in Tanzania, for example. The high numbers of over-age pupils in Mozambique may be the result of a combination of factors such as the high levels of grade repetition and late entry into the first grade.

Botswana, Mauritius, Seychelles and South Africa showed percentages that were below the average**.**

The information summarized in Table 6.20 indicates also that in 2000, the percentage of girls in Grade 6 was 49.7%. There was some variation among countries, ranging from 40% in Mozambique to 56% in Lesotho.

Books in the home

The information summarized in the Table 6.20 shows that the average Grade 6 pupil had 25 books at home. There were huge variations among countries, ranging from a low of 10 books for Malawi to a high of 45 books for Seychelles. In order to improve the reading skills in Mozambique it is essential for pupils to be able to read at home. It is concerning to learn that most pupils had few books at home and at school. To overcome this deficit, the Ministry of Education needs to provide libraries at schools and should advise the parents to buy books for their children and encourage them to visit public libraries in order foster a love of reading.

Index of possessions

Several items were selected in SACMEQ II to indicate the socio-economic status (SES) of pupils in SACMEQ countries. A question was asked in the pupil questionnaire about thirteen possessions they might possess in the home. These items included a daily newspaper, a weekly or monthly magazine, a radio, a TV set, a video cassette recorder (VCR), a cassette player, a telephone, a car, a motorcycle, a bicycle, piped water, electricity (mains, generator, solar), and a table to write on.

The various items were grouped under categories and a certain score was provided under each category. The lowest score possible was zero, if a pupil did not have any item in the list, and the highest was 13. The average number of possessions for pupils was 5.26. The highest was in Mauritius with 9.7 possessions, and the lowest was in Tanzania and Uganda with 3.4 possessions. The countries of Botswana, Mauritius, Namibia, Seychelles, South Africa and Swaziland scored above the average, whereas the rest of the countries scored below the average.

Nutrition

The questions concerning the number of meals the pupils had in a day were included in the questionnaire and the results are summarized in Table 6.20. The table shows that the average index score was 10.7, which indicates that pupils had enough meals per week in SACMEQ countries. The index score in Uganda was the lowest in the region (9.9) while Mauritius had the highest score (11.6).

Parental Education

The pupils were asked about the mother's and father's education levels and the results are summarized in Table 6.20. In Grade 6 the average score was 6.86. There was some variation among the countries, with the highest beings 8.7 in Seychelles and the lowest 5.9 in Malawi and Mozambique. Table 6.21 summarises the general quality of pupils' homes.

Table 6.21

Means and sampling errors for the general quality of pupils' homes

Country	General quality of pupils' homes (index)	
	Mean	**SE**
Botswana	10.5	0.13
Kenya	8.9	0.13
Lesotho	9.5	0.11
Malawi	8.8	0.16
Mauritius	14.5	0.04
Mozambique	9.4	0.12
Namibia	8.4	0.10
Seychelles	13.5	0.03
South Africa	11.9	0.19
Swaziland	10.7	0.11
Tanzania	9.1	0.16
Uganda	7.9	0.13
Zambia	9.3	0.16
Zanzibar	9.0	0.05
SACMEQ	**10.0**	

Source: Data from SACMEQ II database, 2004

Pupils' homes

From Table 6.21 it can be seen that the general score for the quality of pupils' home in Grade 6 in SACMEQ countries was 10. There was some variation, ranging from 14.5 in Mauritius to 7.9 in Uganda. In Botswana (10.5), Mauritius (14.5), Seychelles (13.5), South Africa (11.9) and Swaziland (10.7) the quality of pupils' homes was higher than the average. The quality of pupils' homes affects their performance, as stressed by Dustmann, Rajah and Soest (1998, p.12):

Not only parental input affects the child's performance, but also the studying conditions. We include a variable which measures whether the child has a separated room in which to study. In families with more than one child, children are likely to compete for resources.

Competing for resources in a family with more than one child can have a negative impact on pupil performance. On the other hand, a child can learn how to share the same resources, and this sharing can be positive from an educational point of view.

Language spoken at home

Proficiency in the language of instruction may have a positive impact on pupil performance. Table 6.22 summarises the pupils' language, days absent and repetition:

Table 6.22

Percentages, mean, and sampling errors for the language, days absent, and repetition

Country	Speak the Language of Instruction		Days absent		Repetition	
	%	SE	Mean	SE	%	SE
Botswana	74.0	1.34	0.4	0.03	31.4	1.02
Kenya	86.4	1.21	2.0	0.10	64.1	1.67
Lesotho	70.7	2.31	1.3	0.09	60.8	1.60
Malawi	40.8	2.87	2.0	0.15	66.1	1.95
Mauritius	64.5	2.28	1.8	0.09	18.7	0.83
Mozambique	94.5	0.50	2.7	0.10	78.2	0.98
Namibia	78.0	1.25	1.5	0.08	54.1	1.15
Seychelles	83.5	0.94	0.9	0.04	10.3	0.77
South Africa	76.5	1.77	1.6	0.13	42.3	1.93
Swaziland	63.8	2.14	0.8	0.05	59.3	1.39
Tanzania	89.9	1.19	2.1	0.17	23.3	1.80
Uganda	82.4	1.97	1.9	0.08	52.9	1.86
Zambia	73.4	2.22	2.5	0.12	51.5	1.56
Zanzibar	96.2	0.46	2.0	0.07	27.6	1.05
SACMEQ	**76.7**		**1.6**		**45.7**	

Source: Data from SACMEQ database, 2004

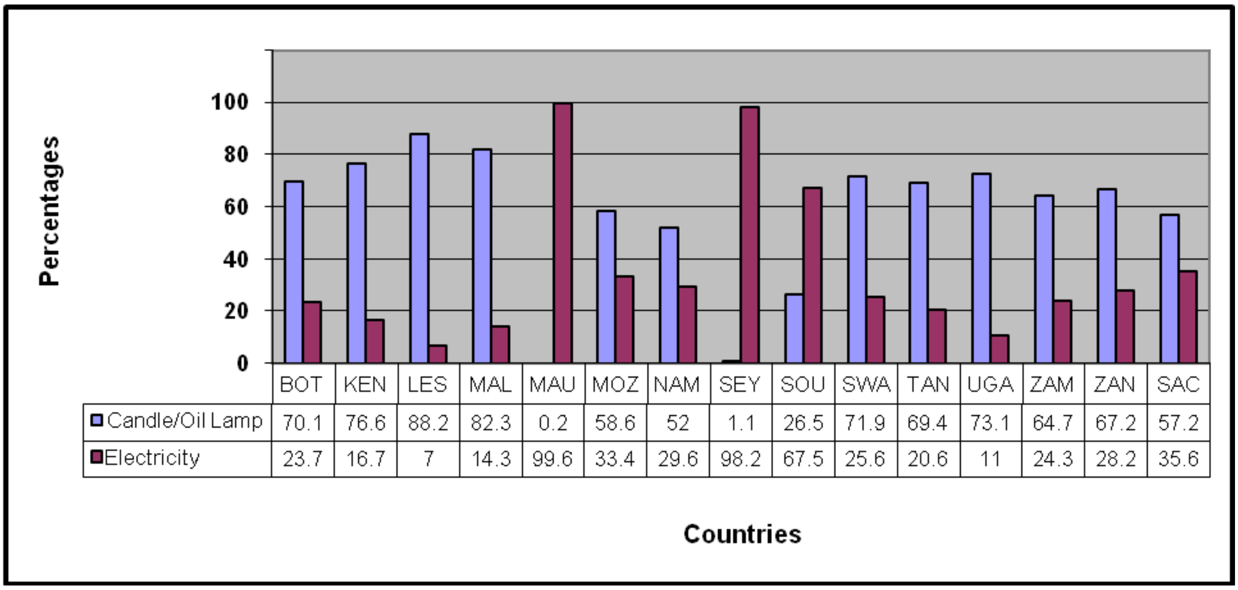
It can be observed in Table 6.22 that 76.7% of pupils spoke the language of instruction at home at least sometimes, but 23.3% of pupils never spoke the language of instruction. There were huge variations among countries, from 41% in Malawi to 96% in Zanzibar. Countries such as Kenya, Mozambique, Seychelles, Tanzania and Zanzibar were the countries where the percentage of pupils that spoke the language of instruction was higher than the average.

Absenteeism and repetition

On average, Grade 6 pupils were absent for 1.6 days during the month preceding the testing. Pupils in Mozambique had the highest number of days absent from school (2.7) and Botswana the lowest (0.4 days). Almost half (46%) of pupils had repeated a grade at least once. Mozambique had the highest percentage of repetition and Seychelles the lowest.

Lighting at home

A further indicator of socio-economic status is the type of lighting that the pupils use at home. Figure 6.6 shows the percentage of pupils that had candles/oil lamps or electricity in their homes (see Appendix 13 for more information).



	BOT	KEN	LES	MAL	MAU	MOZ	NAM	SEY	SOU	SWA	TAN	UGA	ZAM	ZAN	SAC
Candle/Oil Lamp	70.1	76.6	88.2	82.3	0.2	58.6	52	1.1	26.5	71.9	69.4	73.1	64.7	67.2	57.2
Electricity	23.7	16.7	7	14.3	99.6	33.4	29.6	98.2	67.5	25.6	20.6	11	24.3	28.2	35.6

Source: Data from SACMEQ II database, 2004

Figure 6. 6 Percentage of pupils that had candles/lamps or electricity at home

Figure 6.6 shows that more than half (57 %) of the Grade 6 pupils in SACMEQ countries had candles or oil lamps in their homes. On average, only just over a third (36%) of pupils had electricity for lighting in their homes. There was a large difference between countries in terms of the source of lighting ranging, from very few who had candles or oil lamps in their homes in Mauritius to 88% in Lesotho, while only 7% in Lesotho as against almost all pupils in Mauritius used electricity as a source of lighting in their homes.

School location

The distance from home to school is an important factor to consider, and Table 6.23 shows the location of schools in SACMEQ countries.

Table 6.23

School location

Region	Urban		Distance (Km)	
	%	SE	Mean	SE
Botswana	50.9	3.79	21.3	2.49
Kenya	32.7	3.82	14.5	1.32
Lesotho	35.1	4.05	27.8	3.54
Malawi	33.0	4.35	16.6	1.39
Mauritius	51.7	2.29	2.4	0.14
Mozambique	74.5	3.27	13.2	1.59
Namibia	36.5	2.57	30.8	2.02
Seychelles	83.9	0.00	3.9	0.00
South Africa	56.2	3.56	12.7	0.98
Swaziland	29.5	3.86	19.0	1.80
Tanzania	28.6	4.04	15.9	1.49
Uganda	20.3	3.38	21.0	1.66
Zambia	52.1	4.46	35.6	3.64
Zanzibar	41.1	0.00	7.8	0.00
SACMEQ	**44.7**		**17.3**	

Source: Data from SACMEQ II database, 2004

It can be seen in Table 6.23 that most schools catering to Grade 6 pupils in SACMEQ countries were located in rural areas. For instance, almost 45% of the Grade 6 pupils were in urban schools in 2000. The variation between countries ranged from 84% in Seychelles to 20% in Uganda. Mozambique is one the countries where most pupils were being educated in urban schools. This may be a result of having separate schools for lower primary (from Grades 1 to 5) and upper primary (from Grades 6 to 7). As can be seen in the table there is a balanced distribution of schools in Grade 6 in some countries, namely Botswana, Mauritius and Zambia.

Table 6.23 also shows the distance that pupils must travel from home to school. Grade 6 pupils had to walk on average 17.3 km to get to school in SACMEQ countries. There was a large variation among the countries. The Grade 6 pupils travel an average of 2.4 kilometres in Mauritius, while in Zambia they need to travel 35.6 km. Examining the range of distances one notes a huge imbalance among countries in terms of school distribution. The distance from home to school is one of the factors to take into consideration, because it may make have an effect on pupils' performance.

6.3 SUMMARY

The aim of this chapter was to describe the characteristics displayed by teachers and pupils at the Grade 6 level in primary schools in Mozambique and SACMEQ countries, in terms of gender, age, social status, academic education, professional training and professional experience.

There were some differences in terms of teacher training courses in SACMEQ countries. The entrance level for teacher training college in all SACMEQ countries is Grade 12, except in Mozambique, where the entrance level is Grade 10. The level is low and the duration of the courses, two years, is shorter if than in other countries. In two countries, namely Seychelles and South Africa, the duration of the courses is four years and the level of entrance is Grade 11 and 12 respectively, which means that their teachers have higher qualifications than those in other countries (see Table 6.3).

On average, pupils in SACMEQ countries were being taught reading and mathematics by teachers who were 36.5 and 34.6 years old respectively. Mozambique tended to have the youngest teachers in the region (around 32 years), which could be related to the level of possessions that teachers have at home (about 4), which forces them to aim for better conditions of service, such as a higher salary. Mauritius had the oldest teachers at 44.9 years old on average, and a score of 10.9 in terms of possessions at home. The age of a teacher is also related to the teacher's experience, which is an important variable to take into consideration for teacher performance. Usually teachers with more experience tend to perform better than others with less experience (Boehme et al., 1991).

In terms of gender, only 53% of the pupils in Grade 6 in SACMEQ countries were taught reading by teachers who were female. There were large variations among SACMEQ countries, ranging from 99% female reading teachers in Seychelles to 17% in Uganda. Only 40% of the pupils in SACMEQ countries were taught by mathematics teachers who were female. There were large variations among countries, from 8% of female teacher in Uganda to 81% in Seychelles. It is crucial to consider some policies relating to teacher recruitment in countries like Uganda and Seychelles in order to reduce the gender imbalance. Taking the gender issue into account, 30% of the pupils in Mozambique were taught by female reading teachers while 26% were taught by mathematics teachers who were female.

In spite of the fact that the problem of the low level of economic development exists in each of the SACMEQ countries, Mauritian teachers were the oldest and had more years of experience, and Mozambican teachers were the youngest. It is thought that the teachers' possessions as well as their living condition are perhaps related to their level of salary, and that this may be the reason for Mozambicans leaving the teaching profession in search of a better source of income.

An indicator of living conditions was the use of electricity as a source of lighting. Mauritius and Seychelles had the highest percentage (100%) of electricity usage at home for teachers of mathematics and reading, while Uganda had the lowest percentage (6%) of pupils had mathematics teachers with electricity in their homes, as well as the lowest percentage (17%)of pupils who had reading teachers with electricity in their homes. In Mozambique 38% of pupils had reading teachers and 37% of pupils had mathematics teachers that had electricity in their homes as a source of lighting.

For the majority of Grade 6 reading and mathematics teachers in some SACMEQ countries, the main source of job satisfaction was seeing pupils learn, with the level of salary being the second. In Mozambique the level of salary appears to be the most important issue for reading and mathematics teachers, while the availability of teachers' housing is the second most important for reading teachers, and seeing pupils learn appears as the second for mathematics teachers.

In the SACMEQ countries, on average, the percentage of Grade 6 pupils were taught by reading teachers whose academic education ranged from 22% with A-levels, 45% with senior secondary education, 17% with junior secondary education, and 11% with primary education. Only 6% had undertaken tertiary education. Lesotho and South Africa had the highest percentage of reading teachers that had only primary education, 51% and 27% respectively, and Mauritius had the lowest at 0.3%.

In terms of professional training and experience, reading teachers in the SACMEQ countries had 2.2 years of training and 12.9 years of experience on average, while mathematics teachers had 2.3 years of teacher training and 10.8 years of experience. Years of training varied from 1.5 in reading and 1.4 in mathematics in Malawi, to 3.2 in reading in South Africa and 3.3 in mathematics in Seychelles. Years of teaching experience varied from 7.7 in reading in Malawi to 21.7 in Mauritius, and from 6.4 in mathematics Uganda to 13.8 in Kenya. Teachers of reading had 1.8 years of teacher training and 9.9 years of experience in Mozambique, while mathematics teachers had 1.9 years of teacher training and 9.1 years of experience.

The mean age of pupils in Grade 6 in SACMEQ countries in 2000 was 164.8 months (13.7 years). The variation between countries ranged from 180.4 months (15.0 years) in Tanzania to 135.8 months (11.3 years) in Mauritius. The average age of pupils in Grade 6 in SACMEQ countries ranged from 11.3 to 15 years. This age variation may make a difference in terms of pupils' performance, if the level of maturation of the pupils is taken into consideration. However, a further aspect is the normal school entry age of 6 to7 years. In some countries pupils were around 2 or 3 years older than expected, as was the case in Tanzania. In Mozambique, where the average age is 176.7 months (14.7 years) the high number of over-age pupils may be the result of a combination of factors such as the high levels of grade repetition and late entry into the first grade.

On average, Grade 6 pupils in SACMEQ countries had 25.2 books at home, while in Mozambique the pupils had 24.9 books at home. There were huge variations among countries, ranging from a low of 10.1 books for Malawi to a high of 44.6 books for Seychelles.

The pupils in Grade 6 were asked about their mother and father's levels of education. The average score of parents' education in SACMEQ countries was 6.86, and in Mozambique, it was 5.9. There was some variation, with a high of 8.7 in Seychelles and a low of 5.9 in Malawi and Mozambique.

About 78% of pupils in SACMEQ countries spoke the language of instruction at home at least sometimes, and 22% of pupils never spoke the language of instruction out of school. Variations among countries were seen, from 41% in Malawi to 96% in Zanzibar. Higher than average scores of pupils speaking the language of instruction at home were found in Kenya, Mozambique, Seychelles, Tanzania and Zanzibar.

On average, Grade 6 pupils in SACMEQ countries were absent for 1.6 days during the month preceding the testing. Pupils in Mozambique had the highest number of days absent from school (2.7) and Botswana had the lowest (0.4 days). Almost 46% of pupils had repeated Grade 6 at least once, with Mozambique having the highest percentage of repetition (78.2) and Seychelles the lowest (10.3).

This chapter has outlined and described the teacher characteristics, pupil background and problems encountered by pupils in Mozambique and the other SACMEQ countries. The following chapter describes the teaching contexts in Mozambique and the other SACMEQ countries, focusing on the internal and external teaching contexts.

CHAPTER 7

TEACHING CONTEXTS IN MOZAMBIQUE AND SACMEQ COUNTRIES

INTRODUCTION

This chapter firstly presents the Mozambican and regional internal teaching context. The internal teaching context is defined in terms of the availability of sitting/writing places, a teacher's table, a teacher's chair, bookshelves and classroom equipment such as a chalkboard, a dictionary, maps, a book corner, and teacher guides. Thereafter, the chapter presents the Mozambican and regional external teaching context, which is defined in terms of education resources, the condition of buildings, number of classes and pupils, tuition and leadership. In both of these parts of the chapter, the regional comparisons are taken from data collected in the SACMEQ II study.

7.1 THE INTERNAL TEACHING CONTEXT IN MOZAMBIQUE

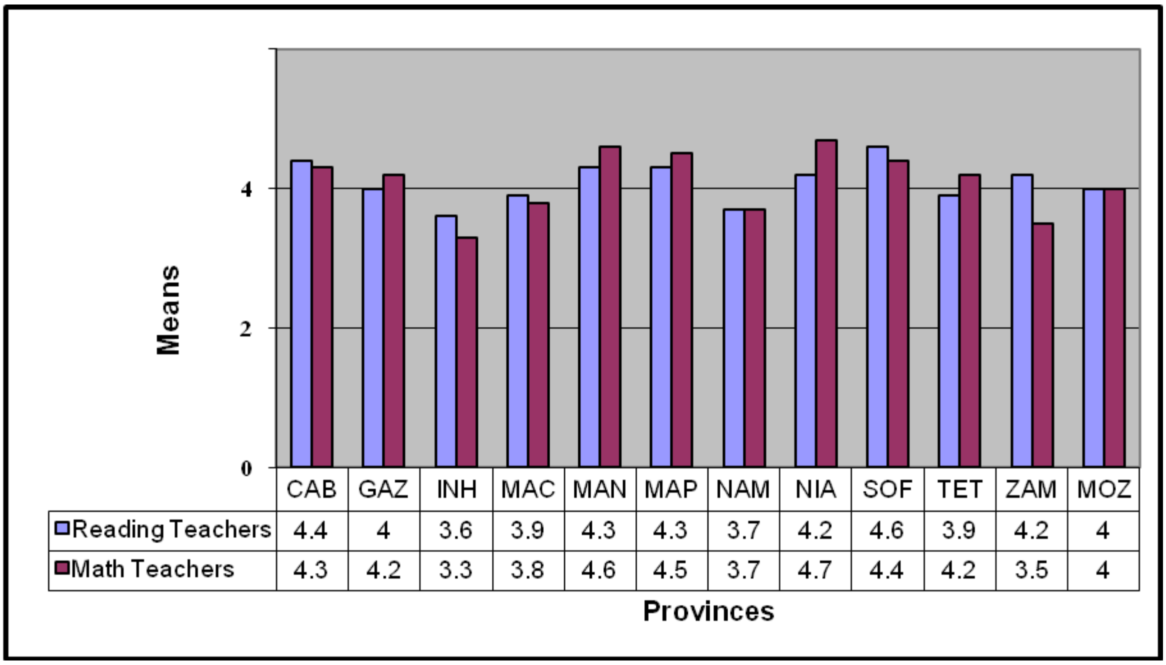
There are many internal and external factors which affect teacher and pupil performance at schools. In Mozambican schools, in general, the internal teaching context plays a major role in educational achievement, and one of the challenges for the Ministry of Education and Culture (MEC) is to address these challenges The following section presents and discusses the internal teaching context in Mozambique.

7.1.1 Availability of Classroom Resources

Questions were asked about classroom furniture such as the teachers' chair, the teachers' table, desks, a usable writing board, chalk, a wall chart of any kind, a cupboard, one or more bookshelves, and a classroom library or book corner. School equipment and school materials are seen to be an essential part of instruction. Besides teacher competence, one of the factors that may influence teacher and pupil performance is the physical environment, which includes variables such as the arrangement of the classroom, equipment and materials, the number of pupils and the seating patterns. In primary education, school conditions and resources are closely related to performance in reading and mathematics.

Most reading and mathematics teachers in Mozambique respectively had usable writing boards (98%, 97%), chalk (96%, 94%), teacher tables (71%, 70%) and teacher chairs (71%, 69%) (see Appendix 14).

Figure 7.1 shows the availability of classroom resources in the country by provinces. An index was formed where the number of items was combined. The minimum value is one, which means that the school did not have any of the listed items, and the maximum is 8, which means that the school had all of the items (see Appendix 15 for more details).



	CAB	GAZ	INH	MAC	MAN	MAP	NAM	NIA	SOF	TET	ZAM	MOZ
Reading Teachers	4.4	4	3.6	3.9	4.3	4.3	3.7	4.2	4.6	3.9	4.2	4
Math Teachers	4.3	4.2	3.3	3.8	4.6	4.5	3.7	4.7	4.4	4.2	3.5	4

Source: Passos, Nahara, Magaia and Lauchande, 2005, p.52

Figure 7.1 Mean for classroom resources index

The results summarized in Figure 7.1 show that, on average, pupils had access to four out of eight items for both reading and mathematics, and there was little variation among provinces. The variations in mean ranged from 3.6 in Inhambane to 4.6 in Sofala for reading teachers. With mathematics teachers, the variation in mean ranged from 3.3 in Inhambane to 4.7 in Niassa. By any standard, this level of provision is less than adequate and requires the attention of the Ministry of Education and Culture.

Sitting and writing places are an essential part of classroom equipment. Table 7.1 shows the percentages of pupils that had sitting and writing places.

Table 7.1

Percentages and sampling errors for pupils having sitting and writing places

Region	% Having sitting place		% Having writing place	
	%	SE	%	SE
Cabo Delgado	46.5	11.46	39.3	10.35
Gaza	49.9	11.31	46.1	10.70
Inhambane	34.5	11.64	33.8	11.60
Maputo Cidade	94.8	3.36	89.0	3.63
Manica	97.9	0.88	91.6	2.16
Maputo Provincia	95.6	3.28	89.6	3.64
Nampula	34.2	9.55	32.1	9.13
Niassa	84.4	7.87	72.3	8.22
Sofala	90.0	5.18	76.4	6.55
Tete	97.6	0.95	85.8	3.72
Zambézia	65.9	9.73	62.1	9.89
Mozambique	**71.5**	**2.66**	**65.8**	**2.64**

Source: Passos, Nahara, Magaia and Lauchande, 2005, p.53

The results of the analysis summarized in Table 7.1 show that, for the country as a whole, almost a third (30%) of Grade 6 pupils were without sitting places and a little more than a third (35%) of Grade 6 pupils were without writing places. The variation among the regions was quite large. In Manica only 2% of the Grade 6 pupils had no chair, while in Nampula 66% of Grade 6 pupils were without a chair.

The problem is aggravated when it comes to the provision of writing places, but it follows the same general pattern across regions. Manica is the region where more than 8% have no place, while in Nampula only 68% of pupils had no writing places.

Textbooks

A further important factor that makes a difference in pupil performance is the supply of textbooks to pupils. Table 7.2 shows the percentages of pupils having their own reading and mathematics textbooks.

Table 7.2

Percentages and sampling errors for pupils having own reading and mathematics textbooks

Region	Own reading textbook		Own mathematics textbook	
	%	SE	%	SE
Cabo Delgado	44.6	6.35	45.5	6.80
Gaza	44.0	8.62	47.6	8.77
Inhambane	40.8	8.28	58.2	9.34
Maputo Cidade	57.9	4.70	63.4	4.85
Manica	68.3	5.18	73.2	4.87
Maputo Provincia	48.9	7.19	48.7	7.11
Nampula	44.1	6.28	50.8	6.40
Niassa	39.1	7.53	41.4	6.79
Sofala	57.8	3.49	66.1	3.87
Tete	73.0	6.70	74.1	6.43
Zambézia	62.8	4.28	62.7	4.39
Mozambique	**53.2**	**1.99**	**58.3**	**2.03**

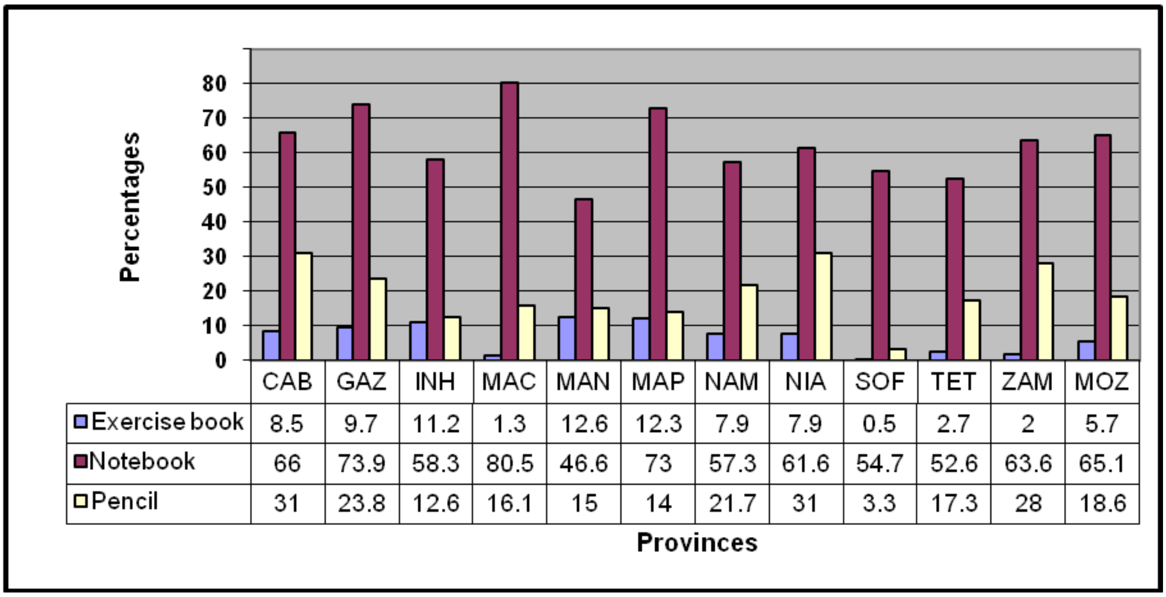
Source: Passos, Nahara, Magaia and Lauchande, 2005, p.49

As seen in Table 7.2, more than half of the Grade 6 pupils had their own reading (53%) and mathematics (58%) textbooks. There were some variations between provinces. Tete had the best supply, with nearly three quarters of all Grade 6 pupils having their own reading (73%) and mathematics (74%) textbooks. Niassa had the lowest percentage of Grade 6 pupils with their own reading (39%) and mathematics (41%) textbooks.

Another reason for the shortage of textbooks in the schools is related to the distribution system itself. When the MEC introduced the new curriculum in 2004, not all pupils received the textbooks, not even in larger towns like Maputo Cidade and in the provincial capitals where there are no apparent problems of access to schools for the distribution of books. The results show that in Maputo Cidade only 60% and 63% of pupils had their own reading and mathematics textbooks respectively.

Stationery

Pupils were asked questions about being equipped with basic classroom materials, namely exercise books, notebooks, pencils, erasers, pens and rulers. Figure 7.2 presents the percentages of pupils who did not have these items (see Appendix 16 for more information).



	CAB	GAZ	INH	MAC	MAN	MAP	NAM	NIA	SOF	TET	ZAM	MOZ
Exercise book	8.5	9.7	11.2	1.3	12.6	12.3	7.9	7.9	0.5	2.7	2	5.7
Notebook	66	73.9	58.3	80.5	46.6	73	57.3	61.6	54.7	52.6	63.6	65.1
Pencil	31	23.8	12.6	16.1	15	14	21.7	31	3.3	17.3	28	18.6

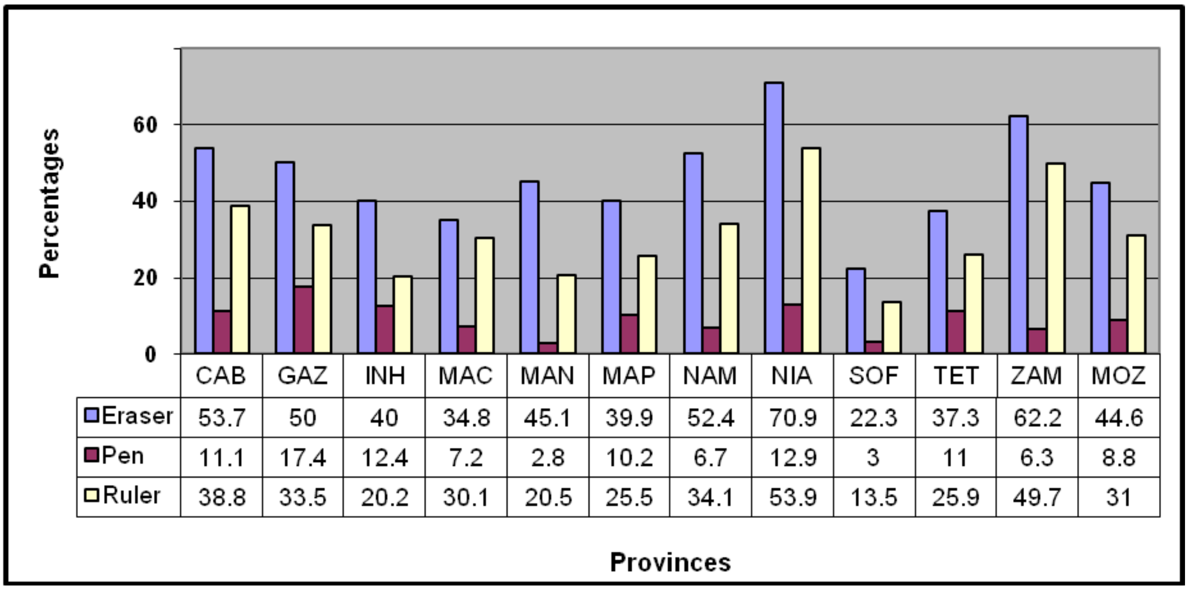
Source: Passos, Nahara, Magaia and Lauchande, 2005, p.50

Figure 7.2 Percentages of Mozambican pupils who did not have any basic classroom materials: Exercise book, notebook and pencil

Most Mozambican pupils use exercise books for writing their work at school. A factor which could have been considered in the apparent high percentage of pupils that did not have notebooks (as can be seen in Figure 7.2) but it seems that exercise books were used in preference to notebooks in Mozambique. Sofala province presents the lowest percentage (1%) of pupils that did not have exercise books. Inhambane, Manica and Maputo Province are among the provinces with the highest percentage of pupils that did not have exercise books: 11%, 13% and 12% respectively. In addition, 19% of pupils in the country did not have their own pencil, with large variations among provinces, ranging from 3% in Sofala to 31% in Niassa.

Taking into consideration the shortage of textbooks, the exercise books and pencils are essential for pupils to take notes or to record the lessons. A shortage of a combination of all of items could contribute to low pupil performance. However, in Mozambique it seems that most pupils are equipped with the basic stationery.

Figure 7.3 shows the percentage of pupils who did not have basic classroom materials such as erasers, pens, and rulers (see Appendix 17).



	CAB	GAZ	INH	MAC	MAN	MAP	NAM	NIA	SOF	TET	ZAM	MOZ
Eraser	53.7	50	40	34.8	45.1	39.9	52.4	70.9	22.3	37.3	62.2	44.6
Pen	11.1	17.4	12.4	7.2	2.8	10.2	6.7	12.9	3	11	6.3	8.8
Ruler	38.8	33.5	20.2	30.1	20.5	25.5	34.1	53.9	13.5	25.9	49.7	31

Source: Passos, Nahara, Magaia and Lauchande, 2005, p.50

Figure 7.3 Percentages of Mozambican pupils who do not have basic classroom materials: Eraser, pen, and ruler

Figure 7.3 shows that for all materials mentioned above, the eraser was the item which about 45% of pupils did not possess, and the ruler was also in short supply with 31% of pupils not having one. There were large variations among provinces. For example, 22% of the pupils in Sofala did not have an eraser, and neither did 71% of the pupils in Niassa. Also, 3% of pupils in Manica did not have a pen, and neither did 13% of the pupils in Niassa. On average across the country, 9% of the pupils did not have a pen. There were also variations in ownership of different items in the same province. For example, 14% of the pupils in Zambézia did not have an eraser while 50% of those same pupils did not have a ruler. Generally speaking, Sofala had the lowest percentage of pupils in Grade 6 without the basic classroom materials and Niassa had the highest number of pupils in Grade 6 who did not have basic classroom materials.

The results of the analysis summarised in Figures 7.2 and 7.3 above show that there was a general lack of basic classroom materials which are to be supplied by parents and not by the Ministries of Education to the Grade 6 pupils. This inability to provide their children with basic classroom equipment such as a pen, pencil, eraser and ruler could be a reflection of the parents' low socio-economic conditions. Such a deficit of basic equipment has implications for the effectiveness of education.

7.2 THE INTERNAL TEACHING CONTEXT IN SACMEQ COUNTRIES

This section presents and discusses the internal teaching context in Mozambique as compared with other SACMEQ countries.

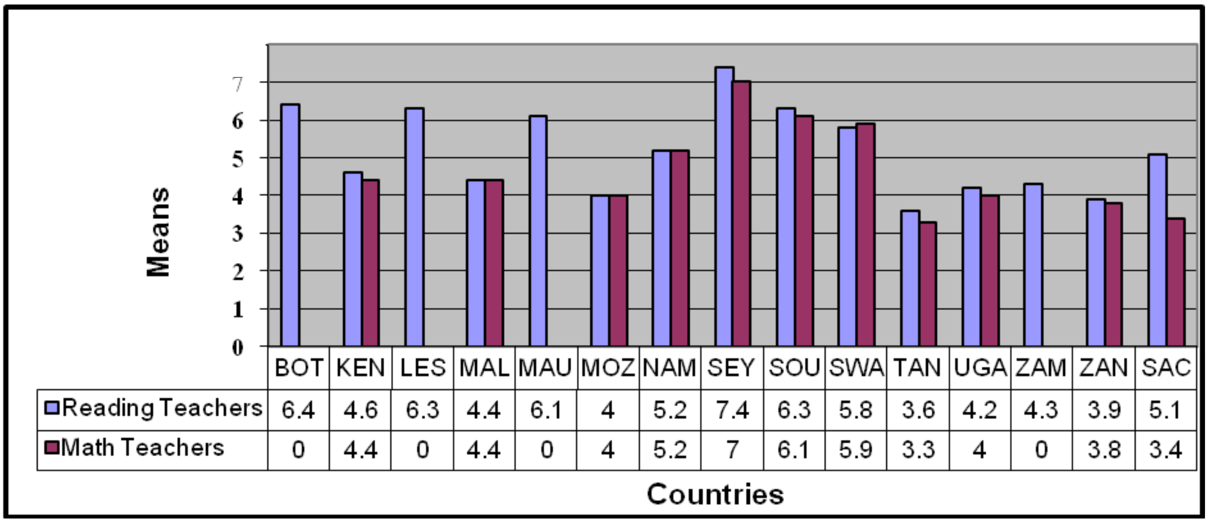
7.2.1 Availability of Classroom Furniture

Teachers were asked questions about classroom furniture, as referred to previously in this chapter. The information summarized in Appendices 16 shows the availability of classroom resources in the SACMEQ countries. The resources comprise basic items such as a usable writing board (94% and 94%), chalk (95% and 93%), one or more bookshelves (9% and 7%), a teacher's table (71% and 66%), a teacher's chair (73% and 68%) and a wall chart of some kind (65% and 61%), for reading and mathematics teachers respectively. Less than half of the classrooms had cupboards (46% and 39%) and a classroom library or book corner (45% and 28%) for reading and mathematics teachers respectively. Only 29% and 25% respectively of classrooms had one or more bookshelves for use by reading and mathematics teachers.

There were large variations among the countries in the SACMEQ II study in terms of classroom resources (8 items). For instance, the percentage of classrooms that had wall charts of any kind ranged from 18% in Mozambique to 97% in Seychelles for reading teachers, while the percentage of classrooms that had cupboards ranged from 8% in Zanzibar to 92% in Seychelles. The percentage of classrooms that had one or more sets of bookshelves ranged from 6% in Zanzibar to 95% in Seychelles, whereas of classrooms with a classroom library or book corner, the percentages ranged from 7% in Tanzania to 81% in Kenya. The resources available to mathematics teachers in these countries followed the same patterns as those available to reading teachers (see Appendix 18 for more information).

In general, Seychelles had more classroom resources than other countries in the SACMEQ II study. The difference among countries in terms of the resources allocated to classrooms may be related to the level of income in each country. Seychelles reports high percentages of classroom resources and is also the country which had the highest Gross National Income (GNI) per capita of the countries in the SACMEQ II study (see Figure 7.7).

Figure 7.4 shows the means and sampling errors for the classroom resources index (SACMEQ II). As in the previous example, the minimum value is one, which means that the school does not have any of the listed items (see Appendix 14), and the maximum is 8, which means that the school has all of the 8 items (see Appendix 19).



Source: Data from SACMEQ II database, 2004

Figure 7.4 Means for the SACMEQ classroom resources index

Figure 7.4 indicates that there was balance in each country in terms of the distribution of classroom resources among mathematics and reading teachers. The countries with more resources in the classroom were the countries whose national income was highest (GDP), namely Seychelles, Mauritius, Botswana, and South Africa. Other countries, such as Swaziland, Lesotho, Kenya, Zambia, Uganda, Tanzania, Mozambique and Malawi have lower national incomes and a correspondingly lower availability of classroom resources.

Table 7.3 indicates the percentage of pupils that had writing places and sitting places, which are considered important factors in classroom resources.

Table 7.3

Percentages and sampling errors for SACMEQ *pupils having sitting and writing places*

Country	**% Having sitting place**		**% Having writing place**	
	%	**SE**	**%**	**SE**
Botswana	100	0.00	100	0.00
Kenya	99.2	0.21	96.1	0.76
Lesotho	99.9	0.08	97.4	1.30
Malawi	56.4	4.39	54.5	4.32
Mauritius	100	0.00	100	0.00
Mozambique	71.5	2.66	65.8	2.64
Namibia	97.4	1.03	95.9	1.18
Seychelles	100	0.00	100	0.00
South Africa	98.1	0.58	96.4	0.70
Swaziland	99.4	0.30	99.0	0.28
Tanzania	96.5	0.64	95.4	0.72
Uganda	89.5	1.70	74.5	2.46
Zambia	92.5	1.25	88.8	1.49
Zanzibar	54.6	0.69	52.1	0.76
SACMEQ	**89.6**		**86.8**	

Source: Data from SACMEQ II database, 2004

There were on average 90% and 87% of Grade 6 pupils with writing places and sitting places respectively. The variation among the countries was quite large. In Botswana, Mauritius and Seychelles all Grade 6 pupils had sitting places and writing places while in Malawi 56% had a sitting place and 52% of pupils in Zanzibar had a writing place. In all SACMEQ countries, pupils in Grade 6 had more sitting places than writing places.

Another factor that makes a difference to teacher and pupil performance is the supply of pupils' textbooks. Table 7.4 presents the percentage of pupils who have their own reading and mathematics textbooks.

Table 7.4

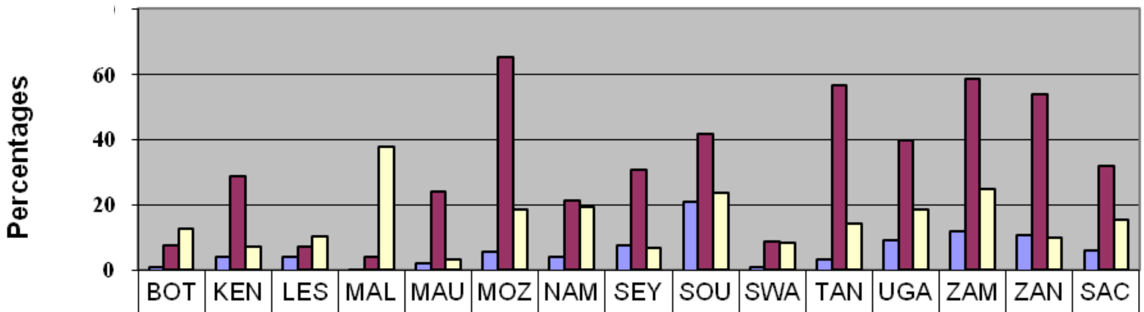
Percentages and sampling errors for SACMEQ pupils who have own reading and mathematics textbooks

COUNTRY	Own reading textbook		Own mathematics textbook	
	%	**SE**	**%**	**SE**
Botswana	77.4	1.82	80.0	1.77
Kenya	26.8	2.63	23.4	2.48
Lesotho	55.3	2.81	45.6	2.89
Malawi	57.0	4.12	56.5	4.13
Mauritius	91.5	1.58	95.9	0.99
Mozambique	53.2	1.99	58.3	2.03
Namibia	46.6	1.99	48.3	2.23
Seychelles	46.9	1.21	75.6	1.05
South Africa	45.5	2.82	41.0	3.01
Swaziland	74.3	2.87	74.7	3.40
Tanzania	6.0	0.56	6.8	0.67
Uganda	14.7	1.26	12.2	1.11
Zambia	14.2	1.50	12.7	1.66
Zanzibar	3.8	0.34	5.1	0.35
SACMEQ	**46.2**		**45.4**	

Source: Data from SACMEQ II database, 2004

As seen in Table 7.4, on average 46% and 45% of Grade 6 pupils had their own reading and mathematics textbooks respectively. There was wide variation between countries. Mauritius had the best supply at 92% and 96% in reading and mathematics books respectively. And Zanzibar had the lowest supply at 4% and 5% of all Grade 6 pupils having reading and mathematics textbooks respectively. In spite of the low supply of the reading and mathematics textbooks, Kenya recorded high performances in reading and in mathematics tests, as will be shown in the next chapter. HUganda (15% and 12%), Zambia (14% and 13%), Tanzania (6% and 7%) and Zanzibar (4% and 5%) had a poor supply of reading and mathematics textbooks in their schools.

Figure 7.5 summarises the percentage of pupils who did not have the basic materials: exercise books, notebooks and pencils (see Appendix 20).



	BOT	KEN	LES	MAL	MAU	MOZ	NAM	SEY	SOU	SWA	TAN	UGA	ZAM	ZAN	SAC
Exercise books	1.1	4	4	0.2	2.3	5.7	4.1	7.7	21.	1.1	3.4	9.3	12	10.	6.1
Notebook	7.6	28.	6.9	3.8	23.	65.	21.	30.	41.	8.7	56.	39.	58.	53.	31.
Pencil	12.	7.2	10.	37.	3.1	18.	19.	6.8	23.	8.4	14.	18.	24.	10	15.

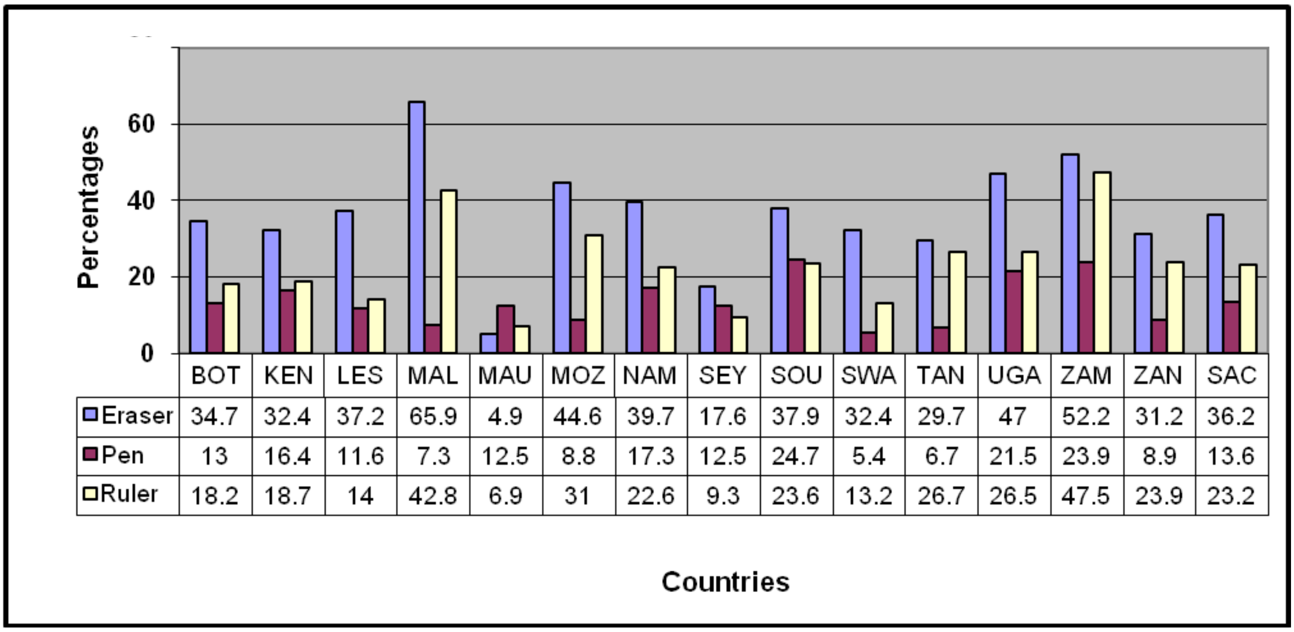
Countries

Source: Data from SACMEQ II database, 2004

Figure 7.5 Percentage for the SACMEQ shortages of basic classroom materials: exercise books, notebooks and pencils

As seen in Figure 7.5, a small minority (6%) of pupils in the SACMEQ II countries did not have exercise books. However, 32% of the pupils did not have notebooks while 15% did not have pencils. There was some variation between countries, ranging from less than 1% in Malawi to 21% in South Africa for exercise books, and from 3% in Mauritius to 38% of pupils in Malawi who did not have pencils. There was a large variation in the shortage of notebooks, which ranged from 4% in Malawi to 65% in Mozambique of pupils who did not have notebooks. In South Africa, 21%, 42% and 24% of pupils did not have exercise books, notebooks and pencils respectively.

In addition to the above shortages of classroom materials, Figure 7.6 presents the percentage of pupils without basic classroom materials such as an eraser, a pen and a ruler (see Appendix 21).



	BOT	KEN	LES	MAL	MAU	MOZ	NAM	SEY	SOU	SWA	TAN	UGA	ZAM	ZAN	SAC
Eraser	34.7	32.4	37.2	65.9	4.9	44.6	39.7	17.6	37.9	32.4	29.7	47	52.2	31.2	36.2
Pen	13	16.4	11.6	7.3	12.5	8.8	17.3	12.5	24.7	5.4	6.7	21.5	23.9	8.9	13.6
Ruler	18.2	18.7	14	42.8	6.9	31	22.6	9.3	23.6	13.2	26.7	26.5	47.5	23.9	23.2

Source: Data from SACMEQ II database, 2004

Figure 7.6 Percentage of SACMEQ pupils without basic classroom materials: eraser, pen, and ruler

Figure 7.6 shows that on average in the SACMEQ II countries, 36% of pupils did not have an eraser, and 23% of pupils did not have a ruler. Only 14% of pupils in all of the SACMEQ countries did not have pens. There was a large variation among countries, ranging from 5% in Mauritius to 66% of the pupils in Malawi, who did not have erasers, and from 5% in Swaziland to 25% of pupils in South Africa who did not have pens. In the case of rulers, the variation ranged from 7% in Mauritius to 48% of pupils in Zambia that did not have rulers. In Zambia 52%, 24% and 48% of pupils did not have erasers, pens and rulers respectively. Generally speaking, Mauritius presents the lowest percentage of pupils in Grade 6 who did not have the basic classroom materials.

7.3 EXTERNAL TEACHING CONTEXT IN MOZAMBIQUE

The next section presents and discusses the external teaching context in Mozambique, addressing in particular school buildings, school grounds, and general services and equipment.

7.3.1 School Resources

Table 7.5 shows the percentages and sampling errors for four categories of general facilities. The four categories, school buildings, school grounds, general services, and equipment were combined by SACMEQ to give a mean of the total school resources.

Table 7.5

Percentages and sampling errors for schools with general facilities in Mozambique

Facility	Percentage for facilities	
	%	SE
School buildings		
School library	27.2	3.13
School hall	8.7	2.12
Staff room	54.6	3.91
School director's office	81.8	3.24
Store room	47.1	3.95
Cafeteria	48.0	3.02
School grounds		
Sports area/ playground	62.9	3.77
School garden	35.9	3.71
General services		
Piped water/well or borehole	59.0	3.42
Electricity	58.5	3.33
Telephone	44.7	2.97
Equipment		
First-aid kit	8.7	1.79
Fax machine	2.4	1.05
Typewriter	80.3	2.89
Duplicator	34.0	3.11
Radio	11.0	2.02
Tape recorder	2.6	0.75
Overhead projector	1.6	0.33
Television set	2.6	1.02
Video-cassette recorder	1.4	1.01
Photocopier	4.4	1.57
Computer	10.6	2.18

Source: SACMEQ II database, 2004

The analysis summarised in Table 7.5 shows that overall there was a lack of general facilities. For example, in terms of school buildings, only 27% of the schools had a library, 55% had a staff room, and 82% of the schools had a designated school director's office. Less than half of the schools had storerooms (47%) and a cafeteria (48%), and in addition, only 63% of the schools had a sports area or playground for their pupils. A small percentage (36%) of the schools had a school garden.

Basic services were also lacking, with only 59% of the schools having piped water, just over half (59%) having electricity, and only 45% having access to a telephone. In terms of equipment, the majority of the schools (80%) had a typewriter, with only 34% being equipped with a duplicator.

There were variations the number of resources that each school had, ranging from just over 1% for a video-cassette recorder to 11% of the schools with a radio.

> *It is clear that, given the current economic development status of the country, it is difficult to provide the schools with all of the general facilities described. However, it would be important to select some of the basic items the Ministry of Education can supply. For instance, facilities such as piped water, electricity, and a school library should be regarded as basic facilities that each school must have. Other facilities that should be regarded as essential, such as the first aid kit and school garden, also reflect very low levels of provision. This should be a matter of concern to the Ministry* (Passos, Nahara, Magaia and Lauchande, 2005, p.43).

Table 7.6 presents the mean and sampling errors for total school resources in Mozambique.

Table 7.6
Mean and sampling errors for total school resources

Region	**Total school resources**	
	Mean	**SE**
CAB	7.3	0.5
GAZ	5.3	0.7
INH	3.6	0.9
MAC	10.7	0.6
MAN	6.1	0.8
MAP	9.1	0.7
NAM	4.4	0.6
NIA	6.5	0.5
SOF	9.0	1.1
TET	6.0	0.5
ZAM	5.6	0.5
Mozambique	**6.9**	**0.2**

Source: SACMEQ II database, 2004

As can be seen from Table 7.6, Mozambique had a mean of nearly 7 out of 22 for total school resources. Maputo Cidade had the highest mean (11) of school resources, and was followed in decreasing order by Maputo Provincia (9), Sofala (9), Cabo Delgado (7); then by Niassa (7) and Tete (6). The mean of school resources in the rest of the provinces was lower than 6.

7.3.2 Tuition

It is common practice in many countries for pupils to regularly take extra classes organized by teachers or other people. These classes may be free or paid for and they may be at school or out of school. There are many reasons for taking extra tuitions classes, but most are related to the need to improve achievement. The SACMEQ II study asked questions about extra tuition and the results are presented in Table 7.7.

Table 7.7

Percentages and sampling errors for the extra tuition taken by pupils outside school hours with details of payment

Provinces	Extra tuition on any subject		There is Payment		There is no payment		Don't know	
	%	SE	%	SE	%	SE	%	SE
Cabo Delgado	90.1	3.88	13.9	2.54	73.1	2.41	13.0	1.98
Gaza	68.4	5.84	28.6	4.06	55.5	4.94	15.9	3.64
Inhambane	68.6	8.22	23.3	6.08	54.0	5.05	22.7	5.81
Maputo Cidade	53.2	5.65	35.9	3.99	57.5	4.00	6.7	1.57
Manica	78.6	3.39	14.2	2.90	61.7	4.17	24.0	3.82
Maputo Prov.	61.6	7.77	25.1	5.09	63.4	4.95	11.5	2.46
Nampula	67.9	6.42	18.1	2.95	67.6	4.73	14.3	3.47
Niassa	79.9	4.03	34.3	4.16	55.7	4.27	10.0	2.34
Sofala	77.0	3.25	39.5	4.65	49.5	3.95	11.1	2.67
Tete	74.7	6.43	28.5	4.14	55.2	3.08	16.3	3.26
Zambézia	57.9	7.30	27.2	4.19	61.3	3.04	11.6	3.04
Mozambique	**66.5**	**2.10**	**26.9**	**1.29**	**59.2**	**1.36**	**13.9**	**1.02**

Source: SACMEQ II database, 2004

As indicated in Table 7.7, two-thirds (67%) of Grade 6 pupils in Mozambique answered that they have extra tuition in any subject. There were large variations among provinces, ranging from 90% in Cabo Delgado to 53% in Maputo Cidade. The low percentage of pupils that had extra tuition in Maputo Cidade may be indicative of the large number of pupils who attend private schools. It appears that free tuition is often offered by family, relatives or friends, while evidence of payment for extra tuition by professionals is mostly found in urban areas.

As stated before, there was no tradition of extra tuition in Mozambique, but because of the increasing importance of the need to attain high grades, 67% of Mozambican pupils have extra tuition, of which 27% is paid for 59% of pupils made no payment, while 14% did not know if their parents paid or not. The variation among provinces for pupils who paid for extra tuition ranged from 14% in Cabo Delgado to 40% in Sofala. The percentage of pupils who did not pay for extra tuition varied from 73% in Cabo Delgado to 50% in Sofala, while for those that did not know, the variation ranged from 7% in Maputo Cidade to 24% in Manica.

7.3.3 Leadership

One of the tasks of the school director is to supervise teacher activities. Table 7.8 shows the percentages and sampling errors for the frequency of advice to a teacher from a school head.

Table 7.8

Percentages and sampling errors for the frequency of advice to a teacher from a school head

Provinces	Percentage of teachers receiving advice 'sometimes' or 'often'			
	Reading teachers		Mathematics teachers	
	%	SE	%	SE
Cabo Delgado	100	0.00	100	0.00
Gaza	95.4	4.66	93.4	6.62
Inhambane	100	0.00	100	0.00
Maputo Cidade	96.5	0.27	99.0	0.39
Manica	100	0.00	100	0.00
Maputo Provincia	100	0.00	88.3	8.46
Nampula	89.2	5.04	90.3	4.04
Niassa	97.5	2.51	100	0.00
Sofala	96.9	3.10	97.6	1.37
Tete	87.5	6.99	100	0.00
Zambézia	81.5	7.15	80.9	5.88
Mozambique	**94.3**		**94.6**	

Source: SACMEQ II database, 2004

Table 7.8 shows that the majority of teachers (94% of reading teachers and 95% of mathematics teachers) generally receive advice sometimes or often from the school head. All reading and mathematics teachers in Cabo Delgado, Manica and Inhambane reported that they had received advice sometime or often from their school heads. The variation among provinces ranged from 100% in the provinces mentioned above to 82% and 81% in Zambézia with reading and mathematics respectively. Only in Maputo Província the reading teachers (100%) received advice more often than the mathematics teachers (88%).

Table 7.9 shows the importance of various school director tasks which involve activities with school staff and the greater community.

Table 7.9

The importance of various school director tasks

Task	Percentage rating as 'very important'	
	%	SE
Contact with community	84.1	2.51
Monitoring pupil progress	87.5	2.68
Administrative tasks	92.0	2.77
Discuss educational objectives with the teaching staff	94.2	1.62
Professional development (Teachers)	89.0	2.40
Professional development (School directors)	69.2	3.85

Source: SACMEQ II database, 2004

The item "discuss educational objectives with the teaching staff" was reported as the most important (94%), followed in decreasing order by "administrative tasks" (92%), "professional development of teachers" (89%), "monitoring pupil progress" (88%) and "contact with community" (84%), and the least important was the "professional development of School directors" (69%).

7.4 EXTERNAL TEACHING CONTEXT IN SACMEQ COUNTRIES

This section presents and discusses the external teaching context in Mozambique in comparison with schools in other SACMEQ countries.

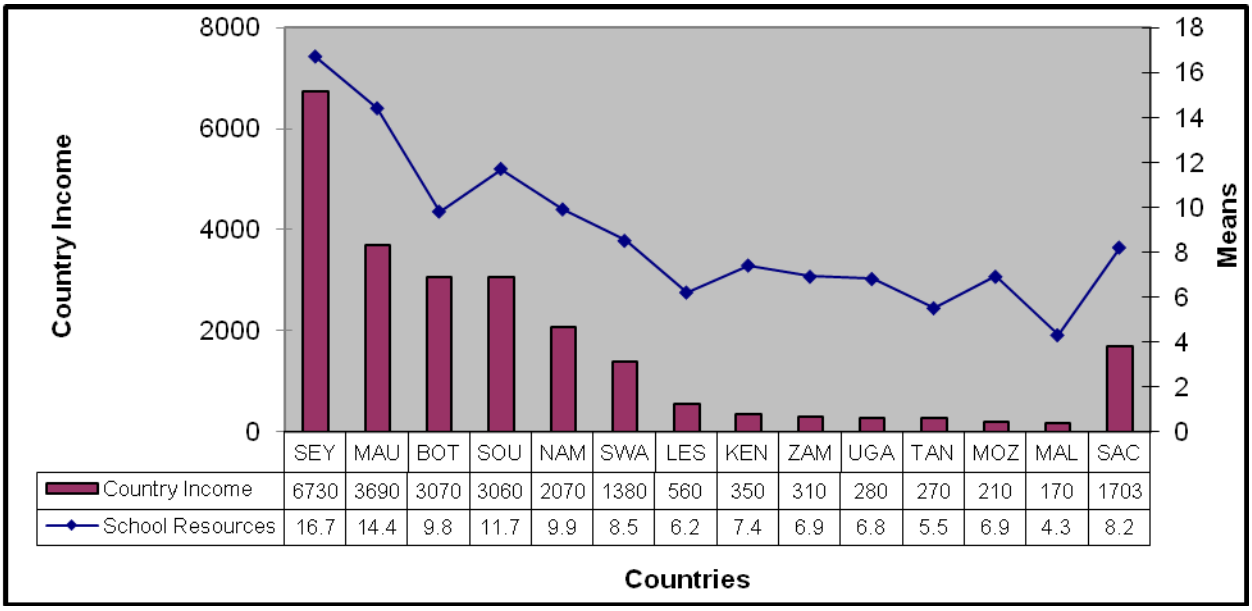
7.4.1 School Resources

School resources found in the SACMEQ countries is presented and discussed, evaluating particularly the school buildings, school grounds, general services and equipment. Table 20 in the appendices presents the percentages and sampling errors for schools with general facilities in SACMEQ.

The majority of the schools (81%) had a sports area, which was followed in decreasing order of prevalence by piped water/a well or borehole (79%), an office for the school head (73%), a school garden (68), a storeroom (61%) and a staff room (60%). The rest of the items occurred in fewer than half of the schools, with the least frequent item being an overhead projector, which was found in only 8% of the schools. In spite of the vital role that a school library plays in both the teacher's and the pupils' academic lives, only 46% of the schools in SACMEQ countries had school libraries. In the Appendix 22, the highlighted numbers shows the variation among countries. Generally, Seychelles was the country with more school facilities in 2000, and Malawi the country with fewer school facilities, particularly the technological equipment. Seychelles was the country with the highest (GNI USD 6730) and Malawi the lowest (GNI USD 170) income among SACMEQ countries. There may be a relation between this fact and the provision of school facilities (see Figure 7.7).

Owing to the varying levels of economic development in SACMEQ countries, it is very difficult to provide all schools with the facilities described in the list. As in the case of Mozambique, it is necessary to define some priorities such as the provision of piped water, which is vital for school sanitation and pupils' hygiene, of electricity, of a school library, a first-aid kit and a typewriter. However, only Seychelles and Mauritius had water and electricity in all of their schools.

Figure 7.7 shows the relation between national income and mean for total school resources (see Appendix 23).



Source: Countries income in USD: data from Murimba and Nzomo, 2003

Source: Total school resources data from SACMEQ II database, 2004

Figure 7.7 Country income (2001) and mean for total school resources index

The information summarised in Figure 7.7 shows that, on average, the index for total school resources in the SACMEQ countries was 8.2. Seychelles had the highest mean of total school resources (16.7), and was followed in decreasing order by Mauritius (14.4), and then South Africa (11.7). In the remaining countries, the mean of total school resources was lower than the average (8.2) and the lowest was Malawi with a mean of 4.3. The variation among countries ranged from 16.7 in Seychelles to 4.3 in Malawi. It can be seen that the total school resources in SACMEQ countries followed a similar pattern to the countries' income; that is, countries with a higher income had more total school resources (Seychelles) and countries with a lower income had fewer total school resources (Mozambique and Malawi).

7.4.2 Tuition

Pupils were asked to indicate whether or not they participated in extra tuition outside school hours and whether they paid for it or not, and the results are reflected in Table 7.10.

Table 7.10

Percentages and sampling errors for the extra tuition taken by pupils outside school hours, and payment

Country	Extra tuition on any subject		There is Payment		There is no payment		Don't know	
	%	SE	%	SE	%	SE	%	SE
Botswana	53.2	2.47	14.7	1.21	61.4	2.07	23.9	1.60
Kenya	87.7	1.91	57.9	2.65	33.0	2.45	9.1	1.05
Lesotho	49.3	3.17	30.1	2.52	51.8	3.08	18.0	1.82
Malawi	79.7	3.47	8.9	1.41	9.6	1.73	81.4	2.34
Mauritius	86.6	1.10	90.7	1.01	8.0	0.89	1.3	0.35
Mozambique	66.5	2.10	26.9	1.29	59.2	1.36	13.9	1.02
Namibia	44.7	2.33	17.3	1.42	39.6	2.37	43.1	2.08
Seychelles	47.7	1.23	25.1	1.58	44.0	1.74	30.9	1.69
South Africa	57.9	3.38	28.6	1.81	33.0	1.79	38.4	1.54
Swaziland	36.3	3.81	10.2	1.77	68.2	4.18	21.6	3.72
Tanzania	86.5	1.38	36.1	2.38	48.5	2.30	15.4	1.37
Uganda	81.8	2.45	51.4	1.84	33.6	1.90	15.0	1.29
Zambia	55.1	3.56	50.8	2.64	39.6	2.40	9.6	1.30
Zanzibar	55.9	0.95	38.0	1.54	24.4	1.21	37.5	1.50
SACMEQ	**63.4**		**34.7**		**39.5**		**25.6**	

Source: Data from SACMEQ II database, 2004

As indicated in Table 7.10, 63% of Grade 6 pupils in SACMEQ countries answered that they had extra tuition classes in a given subject. Kenya, one of the best countries in terms of pupil performance, had the highest percentage (88%) of pupils under extra tuition, while Swaziland had the lowest percentage (36%). Interestingly, Seychelles, with high pupil performance, had less than half of their pupils (48%) attending extra tuition classes outside of school hours which could indicate the higher standard of teaching and learning taking place in that country.

In relation to the payment, it is noteworthy that of the pupils in Grade 6 that received extra tuition in various school subjects, 35% paid for the lessons. Some 40% percent made no payment, while 26% of the pupils reported that they did not know if payment had been made. There was some variation between countries. The proportion of pupils who paid for extra tuition ranged from 91% in Mauritius to 9% in Malawi. This country had recorded that 80% of its pupils had extra tuition, with 81% not knowing whether their parents paid or not. Mauritius had only 1% of pupils who did know. The percentages among countries of pupils who do not pay for extra tuition ranged from 68% in Swaziland to 8% in Mauritius.

7.4.3 Leadership

The frequency of advice to a teacher from a school head is presented in Table 7.11.

Table 7.11

Percentages and sampling errors for the frequency of advice to a teacher from a SACMEQ school head

COUNTRIES	Percentage of teachers receiving advice 'sometimes' or 'often'			
	Reading teachers		Mathematics teachers	
	%	SE	%	SE
Botswana	94.0	1.42	-	-
Kenya	98.5	0.96	97.4	1.35
Lesotho	91.4	2.13	-	-
Malawi	97.2	1.46	96.7	1.63
Mauritius	91.0	1.58	-	-
Mozambique	94.3	1.24	94.6	1.27
Namibia	88.5	2.04	85.5	2.27
Seychelles	90.7	0.61	91.3	0.57
South Africa	88.9	2.67	87.3	2.69
Swaziland	90.5	2.28	89.6	2.43
Tanzania	95.4	1.56	92.7	2.15
Uganda	97.5	1.35	98.4	1.21
Zambia	94.5	1.58	-	-
Zanzibar	95.5	0.30	92.6	0.25
SACMEQ	**93.4**		**92.6**	

Source: Data from SACMEQ II database, 2004

The school head is in a position to give advice to his teachers, and Table 7.11 illustrates that 93% of reading teachers and 93% of mathematics teachers receive advice “sometimes” or “often” from their school heads. There was some variation among countries, ranging from 99% in Kenya to 89% in Namibia for reading teachers, and from 98% in Uganda to 86% in Namibia for mathematics teachers. The information summarised in Table 7.11 shows that school directors do give support to the teachers if a school director is knowledgeable and can offer solid support. This ongoing professional support by the school head could overcome the shortage of support from the Ministry at district or provincial level.

The school director was asked about the importance of various activities in his school, such as contact with the community, the monitoring of pupil progress, administrative tasks, the discussing of educational objectives with teaching staff, and the professional development of both teachers and school directors. This information is summarized in the Table 7.12.

Table 7.12

The importance of various school director tasks

COUNTRY	Contact with community		Monitoring pupils progress		Administrative tasks		Discuss educational objectives with the teaching staff		Professional development (Teachers)		Professional development (School directors)	
	%	SE	%	SE	%	SE	%	SE	%	SE	%	SE
Botswana	85.1	2.83	98.2	1.17	99.3	0.68	96.8	1.43	97.4	1.28	99.3	0.72
Kenya	82.2	3.13	97.3	1.06	96.7	1.50	89.9	2.77	83.1	3.30	100.0	0.00
Lesotho	83.0	3.15	92.8	2.23	95.4	1.81	88.7	2.51	86.2	2.87	95.6	1.69
Malawi	80.0	3.60	97.1	1.32	96.6	1.48	87.5	2.91	88.7	2.87	97.0	1.43
Mauritius	75.8	3.62	89.3	2.51	97.4	1.33	86.8	2.93	86.5	2.90	97.6	1.30
Mozambique	84.1	2.51	87.5	2.68	92.0	2.77	94.2	1.62	89.0	2.40	69.2	3.85
Namibia	88.9	2.13	94.3	1.57	94.8	1.38	83.5	2.56	86.1	2.43	98.0	0.87
Seychelles	72.6	0.00	95.0	0.00	95.0	0.00	95.0	0.00	79.0	0.00	100.0	0.00
South Africa	91.5	2.32	99.4	0.63	95.8	1.83	96.2	1.49	90.5	2.40	95.2	2.14
Swaziland	71.1	4.21	94.5	1.72	92.3	2.02	77.0	4.07	83.3	3.08	95.7	1.86
Tanzania	98.5	1.06	96.9	1.47	94.0	1.88	94.0	2.03	91.3	2.36	98.6	1.03
Uganda	90.1	2.69	91.9	2.55	96.7	1.49	85.9	3.02	88.0	2.77	98.6	1.20
Zambia	86.7	2.70	95.5	1.76	89.9	2.36	87.6	2.72	83.3	3.13	96.6	1.52
Zanzibar	84.8	0.00	88.9	0.00	90.3	0.00	86.5	0.00	83.1	0.00	93.9	0.00
SACMEQ	**83.8**		**94.1**		**94.7**		**89.2**		**86.8**		**95.3**	

Percentage rating of school director tasks as 'very important' — Task

Source: Data from SACMEQ II database, 2004

School heads reported that all of the activities in the list were very important, but that the professional development, particularly of school directors, was the most important (95%), followed in decreasing order by administrative tasks (95%), monitoring pupil progress (94%), discussing educational objectives with the teaching staff (89%), the professional development of teachers (87%), and contact with community (84%). There was variation among countries on issues such as contact with the community, (99% in Tanzania to 71% in Swaziland), monitoring pupils' progress (99% in South Africa to 88% in Mozambique), administrative tasks (99% in Botswana to 90% in

Zambia), discussing educational objectives with teaching staff (97% in Botswana to 77% in Swaziland), the professional development of teachers (97% in Botswana to 79% in Seychelles), and the professional development of School directors (100% in Kenya and Seychelles to 69% in Mozambique). In some countries, it seemed that the school heads were more interested in their own professional development than their teachers' professional development, or even the monitoring of pupil progress. The most important activity in Mozambique was the discussion of educational objectives with the teaching staff (94%) followed by the performance of administrative tasks (92%).

7.5 SUMMARY

The aim of this chapter has been to describe the internal and external teaching contexts in upper primary schools in Mozambique and the other SACMEQ countries. On the one hand, this information constitutes a context for the subsequent analysis and interpretation of teacher and pupil performance presented in Chapter 8, and on the other, the teaching context can be related to teacher competence and pupil performance.

Internal factors which affect school achievement have been identified. These include factors such as poor teacher quality, poor physical inputs like school buildings, lack of classrooms, lack of writing places and other teaching equipment, lack of textbooks, insufficient student contact time, and large class sizes (Miguel and Barsaga, 1997). Some external factors, such as the socio-economic level of the family and the community, parents' moral support of their children, and parents' assessment of the importance of schooling to the child's future have also been identified (Miguel and Barsaga, 1997).

Anderson (1991) stresses the importance of the classroom environment to learning, as it influences both pupils and teachers. He points out that the classroom environment should allow for clear view and access to the teacher as well as having sufficient space to move and work comfortably in the surroundings:

> *Many of the elements of physical environment mentioned in the literature as influencing those who inhabit classroom border on common sense. When the teacher is presenting information to an entire class of students, each student should have an unobstructed view of teacher or the information presented by the teacher. When students are expected to engage in a discussion with other students, the physical arrangement of the classroom should facilitate (e.g., circular arrangements) rather than inhibit (e.g., static row and column arrangements) this discussion. When*

> *equipment and materials are needed, this equipment and these materials should be readily available to the students* (Anderson, 1991, p.38).

In SACMEQ countries, 90% and 87% of Grade 6 pupils had sitting and writing places, respectively, in their classrooms. The variation among countries was quite large. In Botswana, Mauritius and Seychelles all Grade 6 pupils had sitting and writing places while, in Malawi only just over half of the pupils (56%) had sitting places, and the same applied to pupils in Zanzibar, of whom (52%) had writing places. Pupils in Grade 6 in all SACMEQ countries tended to have places to sit (90%) rather than places at which to write (87%). In Mozambique 72% of the pupils had sitting places while 66% had writing places.

Grade 6 pupils in SACMEQ countries had their own reading and mathematics textbooks (46% and 45% respectively). There were large variations among countries, with Mauritius having the best supply of books at 92% and 96% in reading and in mathematics respectively. Zanzibar had the lowest supply, 4% and 5% of all Grade 6 pupils having reading and mathematics textbook respectively. In spite of a low supply of the reading and mathematics textbooks, Kenya had better performance in reading and in mathematics than other SACMEQ countries, as will be shown in the next chapter. Uganda (14% and 12%), Zambia (14% and 13%), Tanzania (6% and 7%) and Zanzibar (4% and 5%) had the worst supply of textbooks for reading and mathematics respectively. Mozambique had a 53% textbook supply for reading and 58% for mathematics.

The Mozambican policy regarding textbooks in primary education is that the books are school property. The pupils borrow the books at the beginning of the year and return them at the end of year. As illustrated in the study, the supply was insufficient as not all pupils had books, and further studies are required to investigate the obstacles in textbook provision. An aspect to take into consideration is the problem of the textbook shortage at school dates back to before the introduction of the new curriculum in 2004. The issue of the lack of textbooks in developing countries is of crucial importance to pupil performance, as is confirmed by Farrell (1989) when he stresses that children in developing countries, who have access to textbooks and other reading material, learn more than those who do not, and that the more books they have, the more they will learn.

One of the challenges for the Ministry of Education and Culture is to provide textbooks for all pupils on time. Chapter 2 of the Ministry of Education’s Strategic Plan for Education (1998) states that one of the relevant changes for improving quality has been the change in textbook production with the development of the National Book Policy, which involves the private sector in the process.

This policy was expected not only to enhance the provision of books, but also to ensure that the books became more responsive to the context of education in Mozambique.

On average, total school resources in the SACMEQ countries were rated at 8.2. Seychelles had the highest mean (16.7) of total school resources, and was followed in rank order by Mauritius (14.4), South Africa (11.7) and Namibia (9.9); then by Botswana (9.8) and Swaziland (8.5). Within the remaining countries, the mean of total school resources was lower than the average (8.2), with the variation among countries ranging from 16.7 in Seychelles to 4.3 in Malawi. Mozambique had 6.9 of total school resources, and this challenge is one that the Ministry of Education and Culture will have to overcome to guarantee the provision of resources to all schools to ensure effective teaching and learning.

In relation to educational leadership in the SACMEQ countries, the percentage of teachers receiving advice from the school head "sometimes" or "often" was 93% for reading teachers and 93% for mathematics teachers. There was some variation among countries, raging from 99% in Kenya to 86% in Namibia for reading teachers, and from 98% in Uganda to 86% in Namibia for mathematics teachers. From the information summarised it can be seen that the school directors gave support to their teachers. If the school director is well qualified and professionally developed, the lack of support from the district or provincial level can be overcome though the school director's provision of support and advice to the teachers in his school. In Mozambique 94% of reading teachers and 95% of mathematics teachers received advice "sometimes" or "often" from the school head.

All activities cited in the questionnaire list were seen by the school directors as very important, but the professional development of school directors (95%) was considered to be the most important. This was followed in rank order by administrative tasks (95%), monitoring pupils' progress (94%), discussing educational objectives with the teaching staff (89%), the professional development of teachers (87%) and finally contact with community (84%). In some countries, it seems that the school directors were more interested in their own professional development than in monitoring pupil progress or teacher professional development. The most important activity in Mozambique was discussing educational objectives (94%), followed by administrative tasks (92%).

The following chapter, Chapter 8, discusses teacher and pupil performance in the SACMEQ II test.

CHAPTER 8

TEACHER AND PUPIL PERFORMANCE IN READING AND IN MATHEMATICS IN MOZAMBIQUE AND IN SACMEQ COUNTRIES

INTRODUCTION

Teaching contexts such as the internal and external teaching contexts in Mozambique and SACMEQ countries as well as the problems that pupils face were described in Chapter 7. The aim of this chapter is to describe teacher and pupil performance in reading and mathematics tests in Grade 6 in primary schools in Mozambique and in the other SACMEQ countries. The performance of both the teachers and the pupils was analysed per province and overall nationally for Mozambique, and then on a regional level, incorporating all SACMEQ countries. Performance was also analysed by gender, socio-economic status and school location (urban and rural). The results presented in this chapter are based partly on the Mozambican report (Passos, Nahara, Magaia and Lauchande, 2005) and partly on further analysis conducted on the data from the SACMEQ database archive (2004). These data are presented as a preliminary step in the background information for further analysis in Chapter 9.

The chapter is structured as follows: Section 8.1 provides general information on the Mozambican and the regional teacher and pupil performance in reading in the SACMEQ countries per province, at national level and for the SACMEQ region. In Section 8.2, the Mozambican and the regional pupil performance in mathematics is presented. Finally, a summary of this chapter is provided in Section 8.3.

8.1 TEACHER AND PUPIL PERFORMANCE IN READING IN SACMEQ II TESTS IN MOZAMBIQUE AND IN SACMEQ COUNTRIES

The next section present, analysing and discuss teacher and pupil performance in SACMEQ II tests in Mozambique and in SACMEQ countries at provincial, national and regional level.

8.1.1 Teacher Performance in Mozambique and in SACMEQ Countries

Teachers' subject content knowledge is one of the factors that directly affects teaching performance (Shulman, 1986) and consequently, pupil performance. For instance, even those teachers with advanced academic qualifications have to ensure that they have the subject content knowledge for primary education teaching. The importance of subject content knowledge for teacher performance was confirmed by Châu's study (1996) in which he stresses that:

One might think a priori that there should not be major problems in this regard at the primary level, given that most teachers in the countries studied have a reasonable level of education (10 to 12 years of school). But the formal level of education is not necessarily synonymous with competence. Classroom observations in the different countries show that certain teachers have an insufficient mastery of the subject matter they teach. In addition, many of them lack the pedagogical know-how required for good presentation of the material. This was particularly true in Madhya Pradesh, where most teachers have not received any specific professional training. But the same problem has also been identified in the other countries (p.86).

Therefore, besides professional training, subject knowledge plays an important role in teacher performance. Content subject matter knowledge, which includes all of the subjects that the teacher must teach, is very important for good teaching, a point which Grossman (1995) confirms by stating that "qualitative research suggests that teacher's knowledge of the content they teach affects both what teachers teach and how they teach it" (p.6118).

To measure cognitive outcomes in the SACMEQ II study, teachers and pupils in all countries, with the exception of the South African and Mauritian teachers, completed the reading and mathematics tests. Pupil and teacher performances were analysed and then categorised into eight "competence levels" in reading and mathematics. Descriptions of competency levels are presented in Table 4.4 in Chapter 4. In essence, the notion is to designate different levels of skills showing what teachers and pupils can do at each level in reading and in mathematics. Although being at one level means that teachers or pupils are ready to start the next level, they cannot, at present, successfully complete the tasks embodied at this next level.

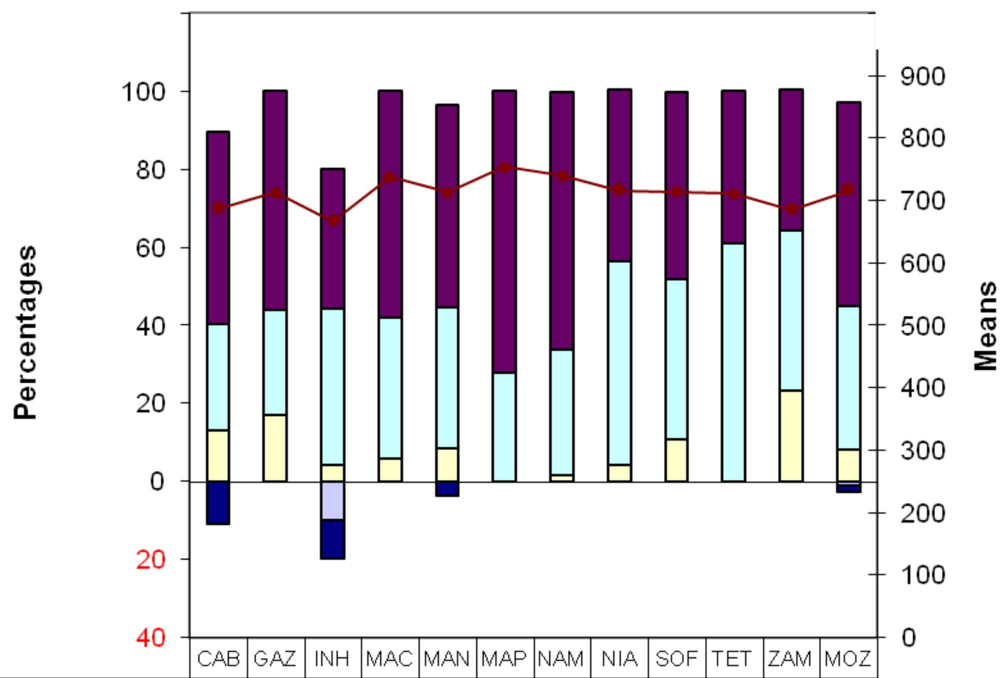
In the SACMEQ II study, teachers were asked to answer a subject knowledge test aligned to the content of the subject area that they taught in upper primary school. The maximum score in the SACMEQ II tests for teachers was 1000. The average score of all teachers in the SACMEQ countries was 733.8 in reading with a standard deviation of 4.42, and 791.7 in mathematics with a standard deviation of 6.59. Teacher performance results in reading and mathematics are presented in Figures 8.1; 8.2; 8.17 and 8.18.

In order to understand pupil performance in the SACMEQ II tests, the Mozambican teacher performance in reading and mathematics tests is presented and discussed because the level of pupil performance in the tests could be influenced by teacher ability and their own performance in literacy and numeracy.

Teacher performance in reading in Mozambique

Teacher subject knowledge, as indicated previously, is one of the factors that determines teacher performance in the classroom (Shulman, 1986; Châu, 1996). Teachers are required to have a level of competence in terms of subject knowledge (Shulman, 1986) and to have attended professional training. In Mozambique, teachers are required to have only a Grade 10 academic qualification for entrance to teacher training colleges, which qualifies them to teach in lower and upper primary education over a two- or three-year period.

Figure 8.1 below shows the percentage and mean scores for the reading test completed by teachers of Grade 6 pupils in Mozambique both per province and nationally (for more details see Appendix 24 – means scores, percentages and SE). However, to facilitate the reading of the figure and others that follow, it is important to note that the figure has two axes, namely percentage, presented on the left, and the mean score on the right. The means of teacher performance are represented by a line, and the maximum is 1000. The percentage shows the performance of teachers at different designated reading and mathematics competence levels in stacked columns (see Chapter 4, Table 4.4 for a description of these levels). The ideal scenario would be to have all teachers performing at Level 8. However, because of the variation in teacher performance in the SACMEQ II tests, this information is divided into two groups separated by a performance line. One group, situated below the line, consists of teachers who performed below Level 6 in terms of their subject knowledge – levels which are deemed unacceptable in this study. The second group consists of teachers who performed up to Level 5. This group is located above the line.



	CAB	GAZ	INH	MAC	MAN	MAP	NAM	NIA	SOF	TET	ZAM	MOZ
8 Critical reading	49	56	36	58	52	72	66	44	48	39	36	52
7 Analytical reading	28	27	40	36	36	28	32	52	41	61	41	37
6 Inferential reading	13	17	4	6	9	0	2	4	11	0	23	8
5 Interpretive reading	11	0	10	0	4	0	0	0	0	0	0	2
4 Reading meaning	0	0	10	0	0	0	0	0	0	0	0	1
3 Basic reading	0	0	0	0	0	0	0	0	0	0	0	0
2 Emergent reading	0	0	0	0	0	0	0	0	0	0	0	0
1 Pre-reading	0	0	0	0	0	0	0	0	0	0	0	0
Mean	688	713	667	738	713	755	740	716	715	711	685	716

Provinces

Source: SACMEQ database, 2004

Figure 8.1 Percentage of teachers, mean scores and attained reading levels of Mozambican reading teachers

As the teachers' test was similar to the pupils' test, it was expected that the teachers' reading skills would have been well developed and that their results would have reflected this development, showing them performing at the highest levels presented in Figure 8.1. However, the teacher average was 716.2, and when this mean is compared with the maximum score (1000), it is evident that the Mozambican teacher mean fell 283.8 below the maximum score with Maputo Província recording the highest scores (754.5) and Inhambane the lowest (666.6).

Figure 8.1 also shows the percentage of Grade 6 reading teachers who reached each of the specific levels of reading in the SACMEQ II tests as well as the percentage of teachers who performed at or below Level 5, “interpretative reading,” which in the teaching profession is considered an unacceptable level. This 3% is of concern to the Ministry of Education, because it was expected that teachers, who are training a country’s youth, would be equipped with the highest levels of skills. Thus teachers with a mean of 716.2 from an overall possible score of 1000 can be regarded as poor performers.

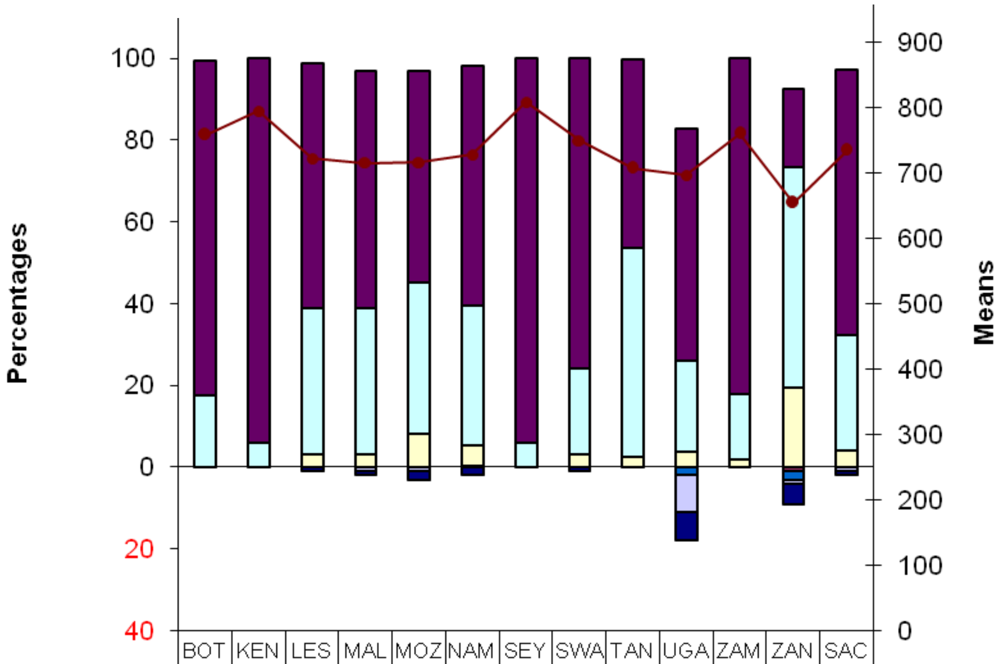
Some 4% to 11% of pupils were taught reading by teachers who performed at or below Level 5, as was the case in Cabo Delgado where 11% of the teachers performed at or below this level, Inhambane with 20% of the teachers, and Manica with 4%. However, 45% of the teachers who taught Grade 6 pupils had reached a test score at either Level 6 (inferential reading) or Level 7 (analytical reading), while 52% of the pupils were being taught reading by teachers who performed at Level 8, the highest level, which is “critical reading.” The variation among provinces ranged from reading teachers reaching on average Level 4 (9.7%) in Inhambane to 71.7% of reading teachers reaching Level 8 in Maputo Provincia, followed by Nampula with 66.4% and Maputo Cidade with 57.8%. The percentage of teachers who reached Level 8 ranged from 35.5% in Zambézia to 71.7% in Maputo Provincia, which was the province with the best reading teacher performance in the country.

These results show that 3% of Mozambican pupils were taught by teachers who performed at or below Level 5, “interpretive reading.” Only 52% of the pupils were being taught by teachers who performed at Level 8, “critical reading,” which implies that the remaining 48% of the pupils were taught by teachers who themselves had not developed the highest level of reading ability and who, on average, attained a lower score than expected by professionals. This large percentage reveals a particular lack of subject knowledge on the part of the teachers and a sad lack of continuous development of skills. It is also to be expected that this weak test performance by such a large group of teachers would have a detrimental effect on pupil performance.

Teacher performance in reading in SACMEQ countries

In this section, a comparison of Mozambican teacher performance with teacher performance in other countries in the SACMEQ reading tests is presented, analysed and discussed.

Teacher performances in reading, the mean and the percentage of teachers reaching each level of reading in SACMEQ II tests are presented in the Figure 8.2 for each of the SACMEQ countries (see Appendix 25).



	BOT	KEN	LES	MAL	MOZ	NAM	SEY	SWA	TAN	UGA	ZAM	ZAN	SAC
8 Critical reading	82	94	60	58	52	59	94	76	46	57	82	19	65
7 Analytical reading	18	6	36	36	37	34	6	21	51	22	16	54	28
6 Inferential reading	0	0	3	3	8	5	0	3	3	4	2	19	4
5 Interpretive reading	0	0	1	1	2	2	0	1	0	7	0	5	1
4 Reading meaning	0	0	0	1	1	0	0	0	0	9	0	1	1
3 Basic reading	0	0	0	0	0	0	0	0	0	2	0	2	0
2 Emergent reading	0	0	0	0	0	0	0	0	0	0	0	0	0
1 Pre-reading	0	0	0	0	0	0	0	0	0	0	0	1	0
Mean	758	794	722	715	716	728	808	749	707	696	760	654	734

Countries

Source: Data from SACMEQ database, 2004

Figure 8.2 Percentage of teachers' mean scores and attained reading levels of regional reading teachers

The expectation of the other SACMEQ countries was that the teachers would reach higher levels of performance than indicated in Table 8.2. However, the average teacher score for reading in the SACMEQ countries was 733.8, which was 266.2 points below the maximum score. There were some variations in the mean teacher performances between participating countries, ranging from 653.7 points in Zanzibar to 807.5 points in the Seychelles. Teachers in Zanzibar scored 89.1 points below the SACMEQ mean while teachers in the Seychelles scored 63.7 points above. Reading teachers from the Seychelles, Kenya, Zambia, Botswana and Swaziland performed above the SACMEQ II mean while the rest of the countries performed below the SACMEQ mean.

It can be observed that 64.9% of pupils in the SACMEQ countries were taught by teachers who performed at Level 8 ("critical reading") while 28% of pupils were taught by teachers who performed at Level 7. Amongst those teachers who reached Level 8, variations ranged from a low 19% in Zanzibar to a high of 94.2% in the Seychelles, followed by Kenya (93.5%), Zambia (82.4%) and Botswana (82%). An area of concern in the SACMEQ countries is that 2.7% of pupils were being taught by reading teachers who performed between Levels 1 ("pre-reading") and Level 5 ("interpretative reading"). Of interest is that in Uganda, 18% of pupils were being taught reading by teachers who performed at Level 5 or below, and in Zanzibar there was a similar occurrence with 7.1% of pupils being taught by teachers who performed at the same level.

If one examines teacher entrance requirements into the teacher training colleges, as reported in Chapter 6 (Table 6.3), entrance requirements in the SACMEQ countries vary from a Grade 10 to Grade 12 qualification requirement. However, the problem is the solid mastery of subject matter knowledge of primary education contents and the acquisition and development of skills. In order to improve teacher performance in primary education, teacher training, its curricula, the practicum, as well as assessment practices need to take the findings of this study into account (for more details see Chapter 10 Section 10.3).

8.1.2 Pupil Performance in Reading Mozambique

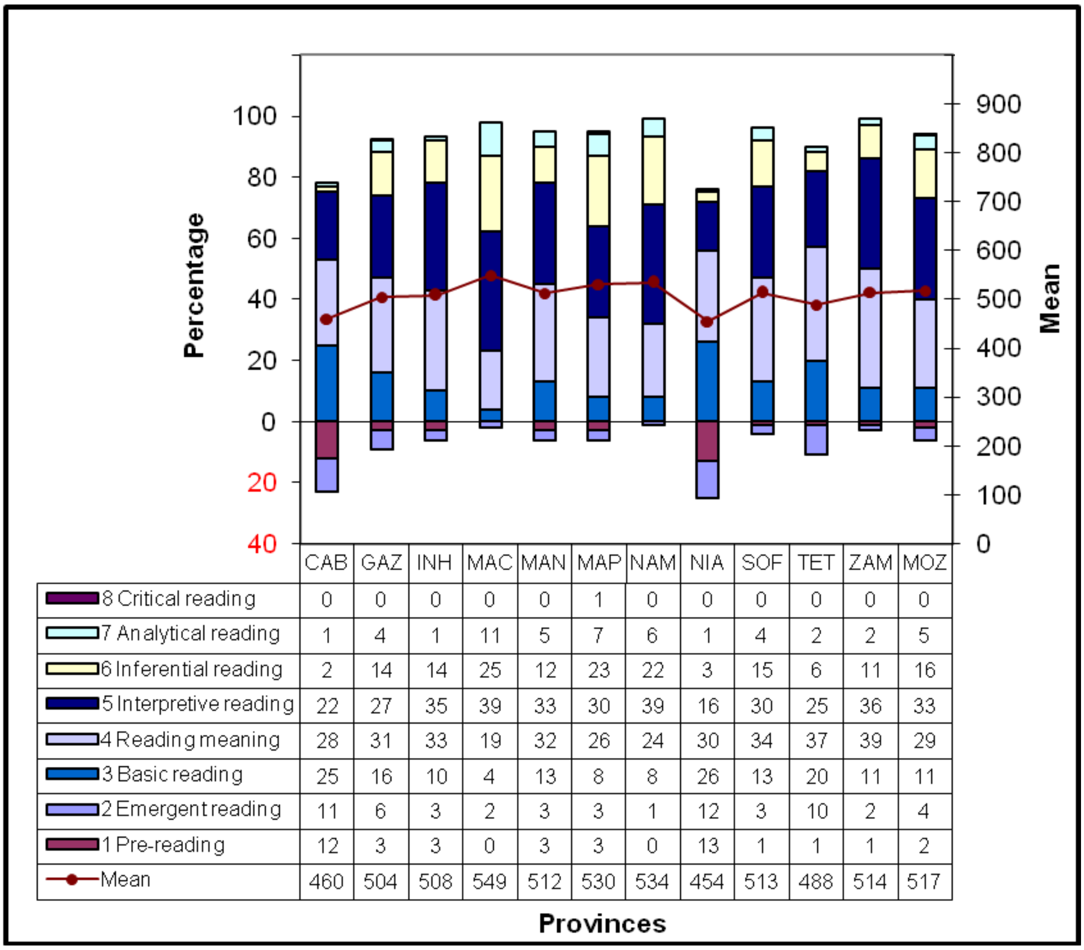
After describing teacher performance in SACMEQ countries, it is important to present and discuss the Mozambican and regional pupil performance in SACMEQ II tests in reading.

Before describing pupil performance in SACMEQ II countries as emerging from the tests, it is important to present and discuss the Mozambican pupil performance in reading and mathematics.

Teacher performance was analysed in the previous sections. Ultimately, the most important consideration is pupil performance, because the goal of the study is to analyse the pupils' performance in relation to their teacher competence. Pupil performance in Mozambique and other SACMEQ countries is analysed in this section.

Each figure has two axes, namely percentage, presented on the left, and the mean score on the right. Pupil performance means are represented by a line, and the maximum is 1000. The multi-colour percentage bar shows the performance of pupils at different designated reading and mathematics competence levels in stacked columns (see Chapter 4, Table 4.4 for a description of these levels). The ideal scenario would be to have all pupils performing at Level 8. However, because of the variation in the case of pupils, there are also two groups. One group, located below the line, is composed of pupils who performed below Level 3, which is considered an unacceptable level for pupil knowledge at Grade 6 for this study. The second group, situated above the line, is composed of pupils who performed up to Level 3. The consensus among SACMEQ members was to define a literate pupil as one who reached Level 3 of literacy competence (Passos, Nahara, Magaia and Lauchande, 2005, p.125).

Figure 8.3 shows the performance of pupils in reading in Grade 6 in Mozambican upper primary schools (see Appendix 26 for more details).



	CAB	GAZ	INH	MAC	MAN	MAP	NAM	NIA	SOF	TET	ZAM	MOZ
8 Critical reading	0	0	0	0	0	1	0	0	0	0	0	0
7 Analytical reading	1	4	1	11	5	7	6	1	4	2	2	5
6 Inferential reading	2	14	14	25	12	23	22	3	15	6	11	16
5 Interpretive reading	22	27	35	39	33	30	39	16	30	25	36	33
4 Reading meaning	28	31	33	19	32	26	24	30	34	37	39	29
3 Basic reading	25	16	10	4	13	8	8	26	13	20	11	11
2 Emergent reading	11	6	3	2	3	3	1	12	3	10	2	4
1 Pre-reading	12	3	3	0	3	3	0	13	1	1	1	2
Mean	460	504	508	549	512	530	534	454	513	488	514	517

Source: SACMEQ database, 2004

Figure 8.3 Percentage of pupils' mean scores and attained reading levels of Mozambican reading pupils

The average score of pupils in all SACMEQ countries was 500 and the standard deviation was 100. Figure 8.3 shows that on average, pupil performance in reading was 516.7, with 16.7 points above the SACMEQ mean, which is 483.3 below the maximum score. There were some variations among the provinces, ranging from 453.8 in reading in Niassa to 549.1 in Maputo Cidade. Maputo Cidade

(549.0), Nampula (533.8) and Maputo Província (529.6) performed above the country's mean of roughly 517, while the remaining provinces performed below the mean. However, the provinces of Niassa, Cabo Delgado and Tete all performed below the SACMEQ mean of 500.

Examining the reading literacy levels reached by Mozambican pupils, it can be observed that the pupils did not achieve Level 8, the level of "critical reading." It is of concern that 1 out of 5 (17.4%) pupils performed between Level 1 ("pre-reading") and Level 3 ("basic reading"), which means that according to the above definition, 17.4% of pupils performed at or below Level 3 and are thus not considered literate. However, almost two thirds (72.6%) of Mozambican Grade 6 pupils reached appropriate literacy levels, with 29% of pupils performing at Level 4 ("reading by meaning"), 32.7% of pupils reaching Level 5 ("interpretative reading"), 16.1% reaching the ("inferential reading") of Level 6, and only 5% being "analytical readers" at Level 7.

There were considerable differences between provinces. Pupils in Niassa (51%), Cabo Delgado (47.8%) and Tete (30.2%) had the highest percentage of performance between Levels 1 and 3, which is considered very low for Grade 6. These three provinces need special attention from the Ministry of Education and Culture in order to promote reading and develop a culture of reading. To address this low level of literacy may have a positive effect on other subjects. Only one percent of the pupils from Maputo Província reached Level 8, the level of critical reading, but 11.3% of pupils in Maputo Cidade reached Level 7, with the majority of Grade 6 pupils (77.6%) performing between Levels 4 and 6. Research (SACMEQ II) has shown that there is a strong correlation between reading and performance in mathematics which means that low reading performance needs attention if pupils are to perform and achieve well (see Chapter 9 Section 9.1.3).

Pupils who have passed Grades One and Two without acquiring and developing the appropriate reading and writing skills, will find it difficult to acquire these skills because the purpose of subsequent classes is not to teach the techniques of reading and writing, but to read and write with comprehension**.** Pupils who have not developed these important skills will be illiterate even after six years of schooling. Another factor to stress is that reading skill, despite its important role for language, is crucial for other subjects too. For instance, if pupils cannot read effectively, good performance in mathematics, science, geography, history or in other subjects may be jeopardised. Teachers in Grades One and Two must be conscious of the consequences and the importance of reading and writing skills for pupils' lives as learners and as citizens and for the success of the education system in terms of internal and external efficiency.

Another factor to take into consideration is related to the process of teacher training, and how teachers in the teacher training colleges are trained to teach reading and writing skills. In

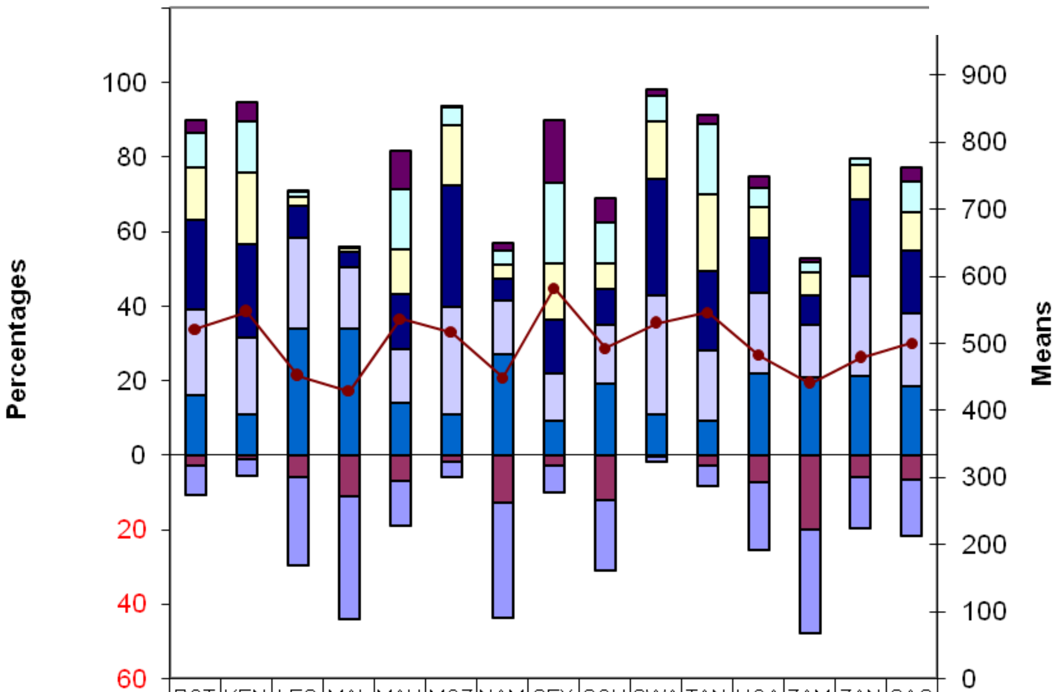
Mozambique there are some shortages in correspondence between the teacher training programmes and the programmes of the National Education System and shortages in coherence between teaching objectives, contents and methods and lower primary education and teacher training programmes (Otto, Bohme and Schafer, 1993) and this result needs to be taken into account.

In Mozambique, primary school programmes have a limited duration as the curriculum within the education system can change any time (as has been seen in other SACMEQ countries). This means that even though initial teacher training is important for students to be taught methodology and pedagogy, teacher training programmes should be diverse, deep and flexible to allow teachers to accommodate changes or development in the system of education.

8.1.3 Pupil Performance in Reading in SACMEQ Countries

This section presents, analyses and discusses pupil performance in Mozambique and other SACMEQ countries in reading.

The means and the percentages of pupils reaching each of the eight reading competency levels are presented in the Figure 8.4 (see Appendix 27).



	BOT	KEN	LES	MAL	MAU	MOZ	NAM	SEY	SOU	SWA	TAN	UGA	ZAM	ZAN	SAC
8 Critical reading	3	5	0	0	10	0	2	17	7	2	3	3	1	0	4
7 Analytical reading	10	14	1	0	16	5	4	22	11	7	19	5	3	2	8
6 Inferential reading	14	19	3	1	12	16	4	15	7	15	21	8	6	9	11
5 Interpretive reading	24	25	9	4	15	33	6	15	9	31	21	15	8	21	17
4 Reading meaning	23	20	24	16	15	29	14	13	16	32	19	22	14	27	20
3 Basic reading	16	11	34	34	14	11	27	9	19	11	9	22	21	21	18
2 Emergent reading	8	5	24	33	12	4	31	7	19	2	6	18	28	14	15
1 Pre-reading	3	1	6	11	7	2	13	3	12	0	3	7	20	6	7
Mean	521	547	451	429	536	517	449	582	492	530	546	482	440	478	500

Countries

Source: Data from SACMEQ database, 2004

Figure 8.4 Percentage of pupils' mean scores and attained reading levels of SACMEQ countries' reading pupils

As can be seen in Figure 8.4, pupil performance in reading was 500 on average in the SACMEQ countries. There were some variations among the countries, ranging from 428.9 in reading in Malawi to 582.0 in Seychelles. Seychelles (582), Kenya (546.5) Tanzania (545.9), Mauritius (536.4), Swaziland (529.6), Botswana (521.1) and Mozambique (516.7) were the countries where pupils performed above the SACMEQ mean, while the remaining countries performed below the SACMEQ mean (500).

The percentages of pupils reaching the eight different levels of reading are presented in the above figure. Despite the fact that by Grade 6 the pupils have had 6 years of schooling, 40% of pupils in the SACMEQ countries managed only to perform between Levels 1 and 3, a basic reading level or worse The majority (56%) performed between Level 4 (reading for meaning) and Level 7 (analytical reading), while a mere 3.7% performed at Level 8 (critical reading).

The findings also show that the lowest percentages can be observed at Levels 1, 7 and 8 and the highest percentages at Levels 3 and 4. The percentages begin to increase at Level 2 and to decline at Level 6. Swaziland (2%), Kenya (5.6%), Mozambique (6.2%), Tanzania (8.3%) and Seychelles (10.4%) had the lowest percentage of pupils that performed at Levels 1 and 2. Seychelles had the highest percentage (16.7%) of pupils that had reached Level 8 (critical reading), followed by Mauritius (10.3%) and South Africa (6.6%).

There were considerable differences among countries. The results also show that countries such as Malawi (78.1%), Namibia (70%), Zambia (68.6%), Lesotho (63.2%), South Africa (50.1%), Uganda (47.3%) and Zanzibar (41.2%) had the highest percentage of pupils that performed between Levels 1 and 3, which is a very low achievement level for Grade 6. These results suggest that special attention from educational authorities and the implementation of specialised programmes to improve reading and writing skills are needed to address this literacy deficit. As pointed out in the Mozambican report, reading and writing skills have major implications for pupil performance in school and in their lives, as well as on the success of the education system - as confirms:

It is never much to stress that everything a child will learn in the future depends on its reading ability. Therefore, it is important that a child's first contact with reading turns out to be a success and not a failure. If the child has easily learned to read then s/he is ready for the task which s/he will have in the future. But if a child has failed s/he will carry a burden (UNESCO, 1973 p.54).

The low quality of an education system "affects not only the internal efficiency of the educational system but also results in a situation where only a few graduates of the school and higher education system could attain the expected skills and competencies" (Aggarwal, 2000, p.2). In addition, most importantly for all pupils, "It is demonstrated by many researchers that a solid foundation in mathematics and language is necessary for primary school children to navigate the information in this technological age. Students with a strong grasp in mathematics have an advantage in academics as well as in the job market" (Aggarwal, 2000, p.14).

The fact that the results reveal a high percentage of pupils who performed at Levels 1 to 3 means that there are factors impeding scholastic progress within the system of education, that should be identified and addressed. A host of factors could be responsible, but one could be the acquisition of reading and writing skills and therefore, a deeper analysis would be required in order to identify these factors at an earlier stage. Thus, it is suggested that the Ministries of Education in these countries should carry out two kinds of research studies.

The first kind would be an assessment of primary education incorporating investigation into:

- The level of teacher knowledge of reading and writing skills methodology.
- How teachers implement the methodology of acquiring and developing reading and writing skills.
- How textbooks implement the methodology of acquiring and developing reading and writing skills.
- How teachers prepare pupils to acquire and develop reading and writing skills.

The purpose of such a study would be to identify the major difficulties pupils experience in acquiring and developing reading and writing skills, and to evaluate the level of teacher knowledge of the methodology.

The second kind would be an assessment of all teacher training processes with a focus on the methodology of teaching reading and writing skills, including:

- The curriculum for teacher training;
- The trainers' profiles;
- The modules in teacher training colleges;
- Teacher profiles at Annexe schools;
- Pedagogical practices at primary school level; and
- Textbooks used in primary schools.

The purpose of the study would be to identify the problems that might causes of weak teacher performance.

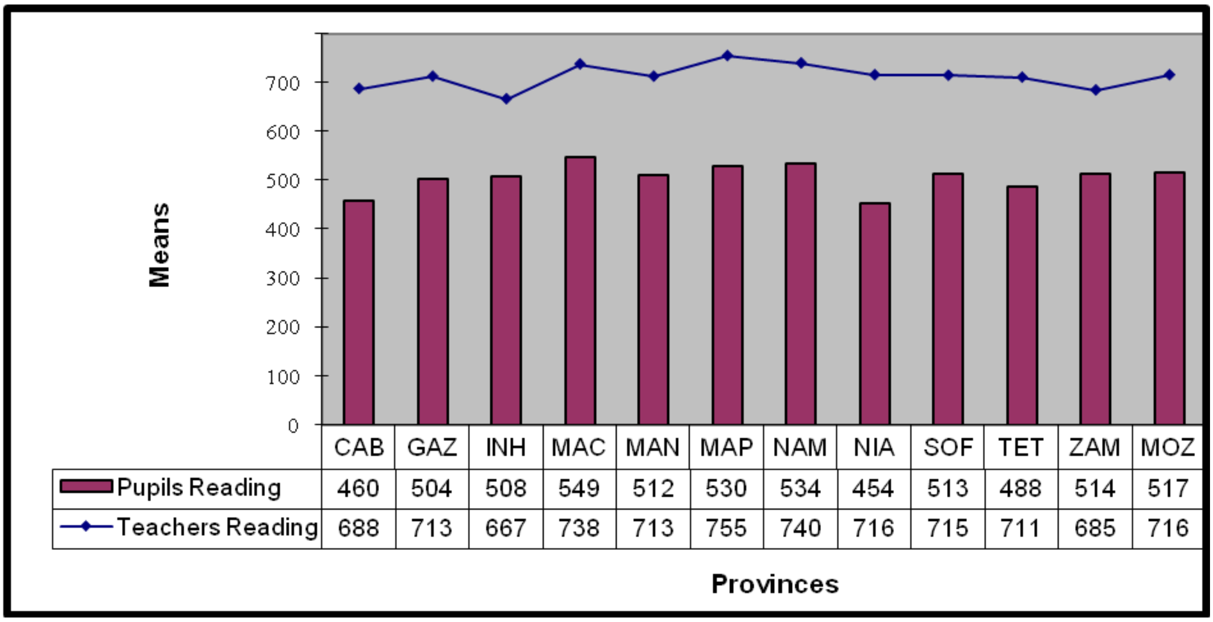
8.1.4 Teacher and Pupil Performance in Reading in Mozambique and in SACMEQ Countries

The performance of Mozambican teachers and pupils in the SACMEQ reading tests is presented, analysed and discussed in this section at national and provincial level.

Teachers and pupil performances in reading in Mozambique

As stressed by many authors, namely Kanu (1996), Medley, (1982), Grossman (1995) and Shulman (1986), just to mention a few, there is a relationship between teacher quality and pupil performance. Grossman (1995) insists that without the essential base of subject matter knowledge, primary teachers are simply unable to provide effective instruction. The level of confidence in subject matter affects teaching and the way the teachers teach (Shulman, 1986) and consequently the way pupils learn and ultimately, their achievement. In order to find out how pupils and teachers perform in Mozambique and in SACMEQ countries, this section analyses teacher and pupil performance.

Figure 8.5 shows teachers and pupils' performance in reading in Grade 6 in Mozambique (see Appendix 28).

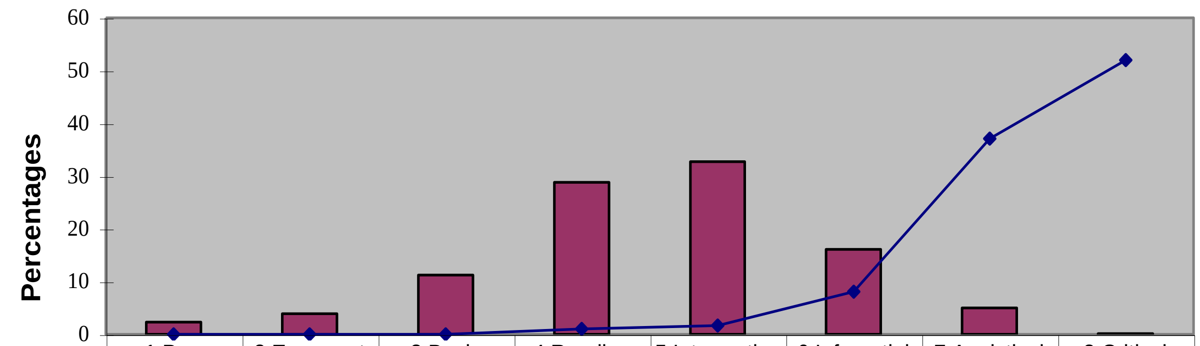


Source: Data from SACMEQ database, 2004

Figure 8.5 Mean scores of reading pupils and teachers in Mozambique

Figure 8.5 shows that in Mozambique on average teachers performed better in both reading (716.2) than their pupils, who had 516.7 points in reading. A variation among provinces is seen, in comparing the differences between teachers and pupils' performance. The difference between teachers and pupils in terms of performance in reading ranged from 159 in Inhambane to 262 in Niassa.

Figure 8.6 shows Mozambican teachers and pupils' performance in reading at different levels of competency (see Appendix 29).



	1 Pre-reading	2 Emergent reading	3 Basic reading	4 Reading meaning	5 Interpretive reading	6 Inferential reading	7 Analytical reading	8 Critical reading
Pupils	2.3	3.9	11.2	28.8	32.7	16.1	5	0.1
Teachers	0	0	0	1	1.7	8.1	37.1	52

Skill Levels

Source: Data from SACMEQ database, 2004

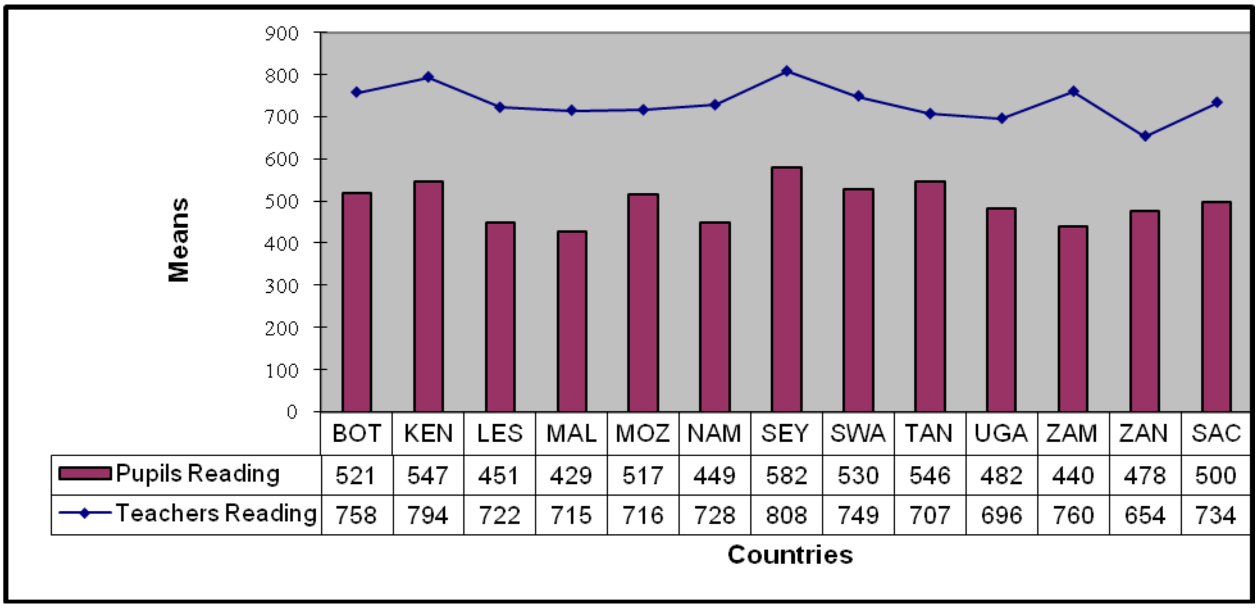
Figure 8.6 Percentage of Mozambican teachers and pupils' performance in reading at different levels of competency

Figure 8.6 shows that pupil performance decreased at Level 6 and teacher performance consistently increased from Level 6, "inferential reading". The findings show that in Mozambique the lowest pupil percentages can be observed at Levels 1, 2, 7 and 8, with the highest percentages being found at Levels 4 and 5. The percentages begin to increase at Level 3 and decline at Level 6. In the case of teachers, the findings show that the lowest percentages can be observed at Levels 1, 2, 3, 4 and 5 and the highest percentages at Levels 7 (analytical reading) and 8 (critical reading), which shows an increase in the level of literacy among teachers.

The next section presents teacher performance in SACMEQ countries as well as their pupils' performance in reading tests.

Teacher and pupil performance in SACMEQ countries

Figure 8.7 shows teachers and pupils' performance in reading in Grade 6 in the SACMEQ countries (see Appendix 30).

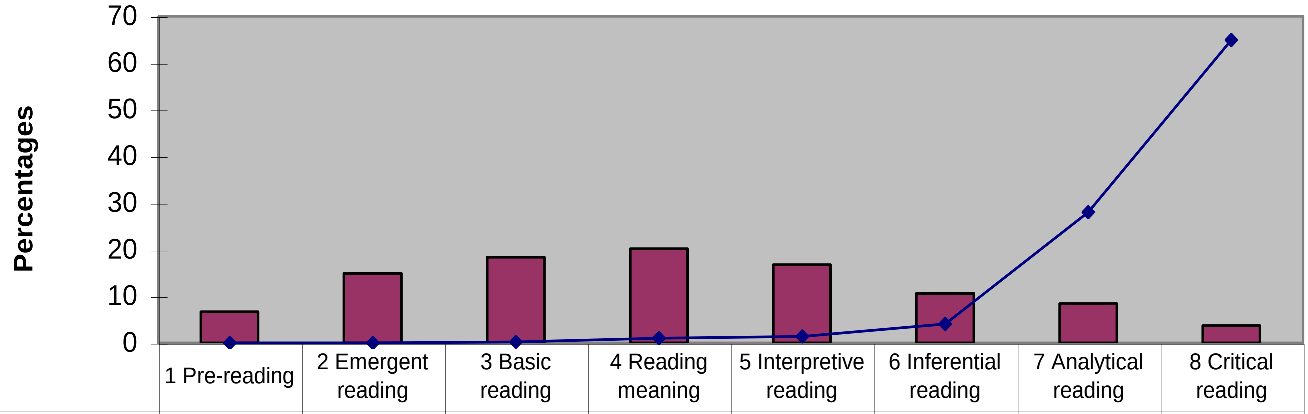


Source: Data from SACMEQ database, 2004

Figure 8.7 Mean scores of reading pupils and teachers in SACMEQ countries

Just as in Mozambique, teachers in the SACMEQ countries performed on average higher than their pupils, achieving a mean of 733.8 in reading. In SACMEQ countries, the difference between teachers and pupils in terms of performance in reading ranged from 176 in Zambia to 286 in Malawi.

Figure 8.8 shows teachers and pupils' performance in different reading competency levels in the SACMEQ countries (see Appendix 31).



	1 Pre-reading	2 Emergent reading	3 Basic reading	4 Reading meaning	5 Interpretive reading	6 Inferential reading	7 Analytical reading	8 Critical reading
Pupils	6.7	14.9	18.4	20.2	16.8	10.6	8.4	3.7
Teachers	0	0	0.2	1	1.4	4.1	28	64.9

Source: Data from SACMEQ database, 2004

Figure 8.8 Percentage of SACMEQ teachers and pupils' performance in reading at different levels of competency

In the case of pupils in the SACMEQ countries, the lowest percentages can be observed at Levels 1, 7 and 8, and the highest percentages at Levels 3 and 4. The percentages begin to increase at Level 2 and decline at Level 6. In the case of teachers, the findings show that the lowest percentages can be observed at Levels 1, 2, 3, 4 and 5 and the highest percentages at Levels 7 (analytical reading) and 8 (critical reading).

Pupil performance in reading by gender, socio-economic status and school location in Mozambique and in SACMEQ countries

In order to find out the impact of other factors on pupil performance, the following section presents and discusses pupil performance in reading by gender, socio-economic status and school location in Mozambique and in other SACMEQ countries

To analyse the results relating to gender, socio-economic status and school location, the eight levels were reduced and combined into four categories, in accordance with the Mozambican marking scale, and will be classified as: Category 1 poor, Category 2 fair, Category 3 good, and Category 4 very good:

In reading, the categories are as follows:

Category 1 comprises Levels 1 “pre-reading”, 2 “emergent reading” and 3 “basic reading”

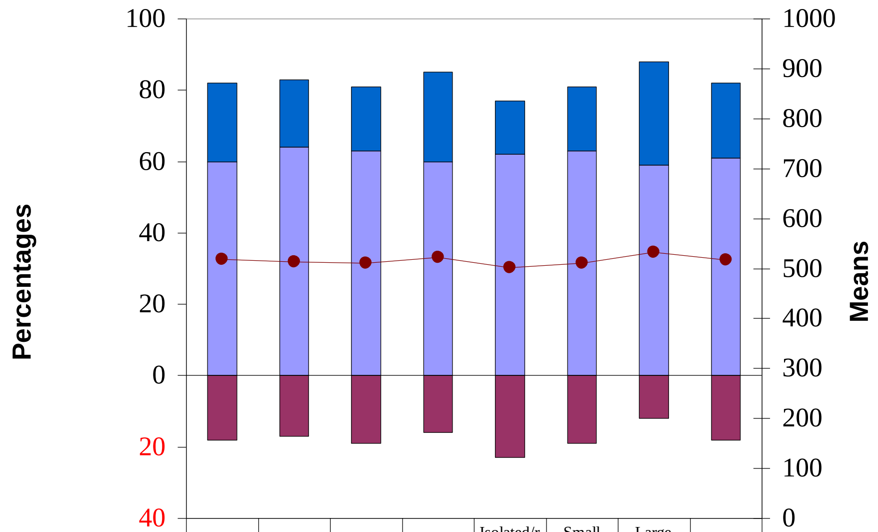
Category 2 comprises Levels 4 “reading for meaning” and 5 “interpretive reading”

Category 3 comprises Levels 6 “inferential reading” and 7 “analytical reading”

Category 4 comprises Level 8 “critical reading”.

Pupil performance in reading by gender, socio-economic status and school location in Mozambique

Figure 8.9 shows pupils’ mean performance in reading by gender, socio-economic status and school location (see Appendix 32).



	Boys	Girls	LowSES	High SES	Isolated/rural	Small town	Large town	MOZ
4 Critical reading	0	0	0	0	0	0	0	0
3 Inferential/analytical reading	22	19	18	25	15	18	29	21
2 R. Meaning/Interpretative reading	60	64	63	60	62	63	59	61
1 Pre/Emergent/Basic reading	18	17	19	16	23	19	12	18
Mean	518	514	511	523	502	511	533	517

Source: SACMEQ database, 2004

Figure 8.9 Percentage of pupils’ mean scores and attained reading categories of Mozambican reading pupils by gender, socio-economic status and school location

Figure 8.9 demonstrates that all means were above the SACMEQ mean (500) but little difference was seen between the sub-groups in terms of the mean and the levels achieved by pupils. Boys performed slightly better than girls in reading (518.4; 514.1). Furthermore, pupils from higher SES performed slightly better than pupils from low SES (523; 510.5), while pupils from large towns performed better than pupils from small towns and isolated or rural areas (533.3; 510.5 and 502.3) respectively. The same figure shows the different reading competency levels of pupils according to their gender, socio-economic status and school location with 17.6% performing at the level of Category 1, the majority (61.4%) reaching Category 2, and 20.9% performing at the level of Category 3.

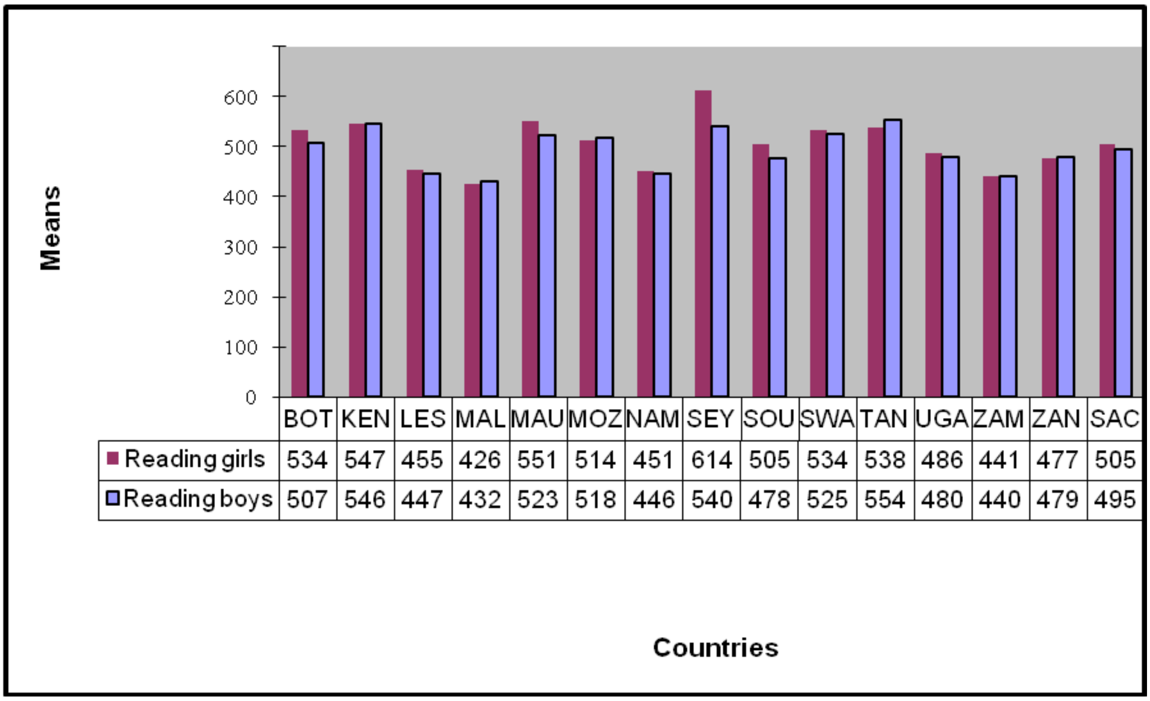
In terms of gender, 17.7% and 16.8% of boys and girls respectively reached Category 1 and 22.2% of boys and 19.4% of girls performed within Category 3. The majority of boys (59.9%) and girls (63.8%) reached Category 2.

Examining pupils' performance according to their SES, it can also be seen that 19.1% of pupils from a low socio-economic status and 15.7% of pupils from high socio-economic status reached Category 1 ("pre/emergent/basic reading"), while 17.6% of pupils from low SES performed within Category 3 and 24.6% of pupils from a high SES reached Category 3. However, the majority (63.1%) of pupils from a low SES and a high SES (59.7%) reached precisely Category 2.

Figure 8.9 also reveals pupil performance according to school location. A higher percentage of pupils from isolated/rural areas (22.9%) managed to reach only Category 1, in contrast with pupils from small towns (19%) and large towns (12%). Pupils from isolated or rural areas (15.2%), from small towns (18%) and large towns (29.3%) performed at Category 3. The majority of pupils 61.9%, 62.6% and 59% respectively from isolated/rural areas, small towns and large towns, reached precisely Category 2.

Pupil performances in reading by gender in SACMEQ countries

Figure 8.10 shows pupil performance in reading by gender (for more information see Appendix 33).



	BOT	KEN	LES	MAL	MAU	MOZ	NAM	SEY	SOU	SWA	TAN	UGA	ZAM	ZAN	SAC
Reading girls	534	547	455	426	551	514	451	614	505	534	538	486	441	477	505
Reading boys	507	546	447	432	523	518	446	540	478	525	554	480	440	479	495

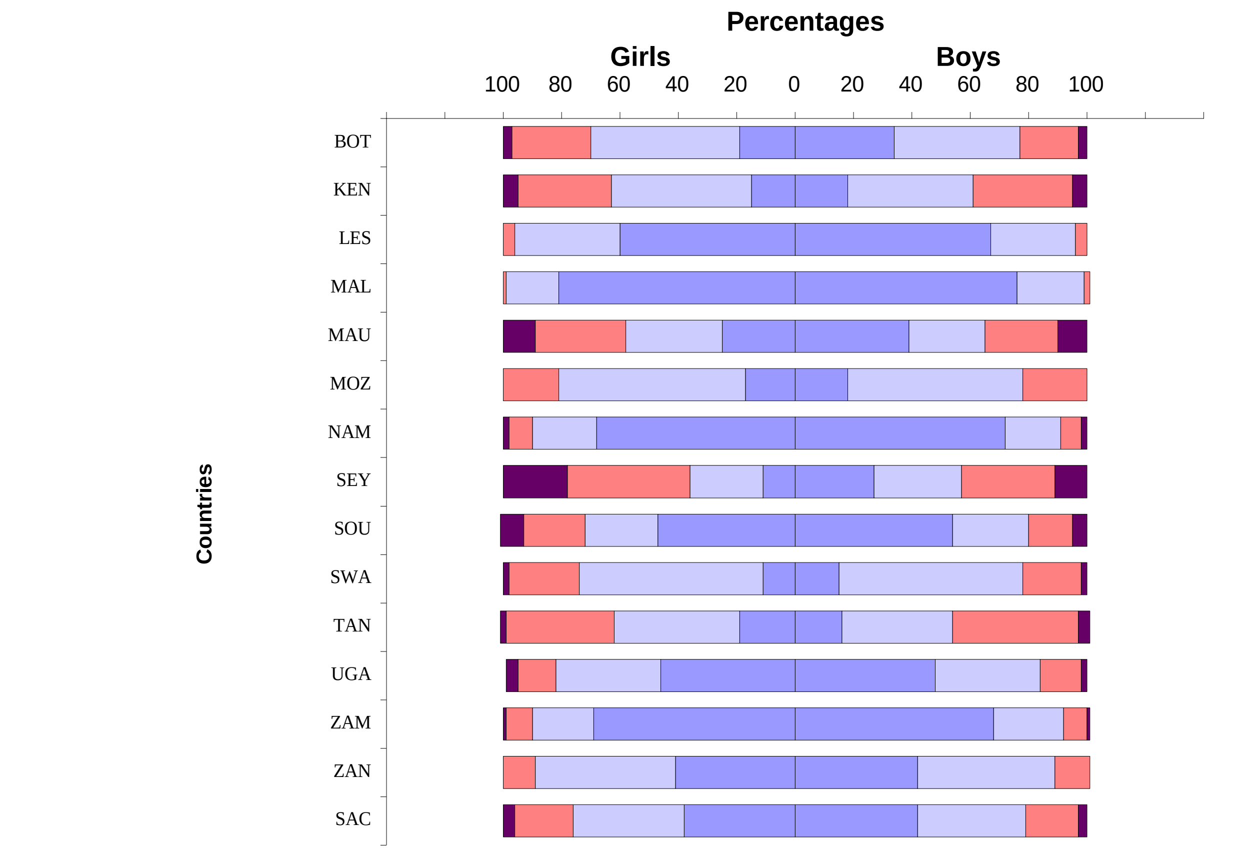
Source: Data from SACMEQ database, 2004

Figure 8.10 Mean scores of reading pupils of SACMEQ countries by gender

Figure 8.10 shows that in the SACMEQ countries, on average, girls performed better in reading (505.1) than boys (494.6). In contrast, boys in Lesotho, Malawi, Mozambique, Tanzania and Zanzibar performed better in reading than girls. Malawi had the lowest pupil performance for reading, with girls achieving an average of 425.6 points for reading in contrast to the boys achieving 431.9. Girls performed better than boys in reading (614.2) in Seychelles and in mathematics (590.2) in Mauritius, but in Tanzania, boys performed better than girls in reading (554.3).

Figure 8.11 shows pupil performance by gender in the SACMEQ countries. An explanation is given to facilitate the reading of this and subsequent bar graphs. The left-hand axis lists the SACMEQ countries in alphabetical order, and the top axis gives the percentages of competency. The left-hand bar illustrates the performance of girls in combined reading competence levels, while the right-hand bar illustrates that of the boys. The levels of reading competency are listed below the bar graph, with the results from individual SACMEQ countries.

Figure 8.11 presents pupil results by gender in the SACMEQ countries on the combined reading competency levels (see Appendix 34 for details).



	SAC	ZAN	ZAM	UGA	TAN	SWA	SOU	SEY	NAM	MOZ	MAU	MAL	LES	KEN	BOT
4 Critical reading (G)	4	0	1	4	2	2	8	22	2	0	11	0	0	5	3
3 Inferential/analytical reading (G)	20	11	9	13	37	24	21	42	8	19	31	1	4	32	27
2 R. Meaning/Interpretative reading (G)	38	48	21	36	43	63	25	25	22	64	33	18	36	48	51
1 Pre/Emergent/Basic reading (G)	38	41	69	46	19	11	47	11	68	17	25	81	60	15	19
4 Critical reading (B)	3	0	1	2	4	2	5	11	2	0	10	0	0	5	3
3 Inferential/analytical reading (B)	18	12	8	14	43	20	15	32	7	22	25	2	4	34	20
2 R. Meaning/Interpretative reading (B)	37	47	24	36	38	63	26	30	19	60	26	23	29	43	43
1 Pre/Emergent/Basic reading (B)	42	42	68	48	16	15	54	27	72	18	39	76	67	18	34

Source: Data from SACMEQ database, 2004

Figure 8.11 Percentage of pupils' reading categories in SACMEQ countries by gender

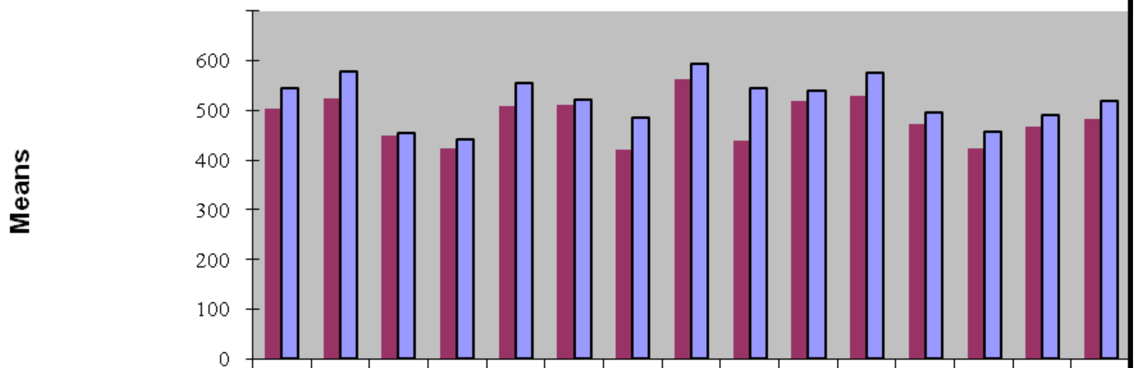
On average, girls performed better in reading than boys. For instance, on average 42.3% and 37.7% of boys and girls respectively performed at Category 1 and 36.6% and 37.7% of boys and girls respectively reached Category 2. Almost a fifth (18.1%) of boys and 19.6% of girls reached Category 3 with only 3.5% of boys and 4.8% of girls performing in Category 4. In the Indian study referred to previously, "the differences in mean achievement scores due to gender were reflected both in language and in mathematics. However, the girls scored much lower in mathematics as compared to the boys" (Aggarwal, 2000, p.6).

Girls reached higher categories in reading than boys in the majority of countries, and it is important to stress that Seychelles was the only country where girls reached the highest reading categories - 41.8% and 21.9% performed at Categories 3 and 4 respectively. There were large variations among the SACMEQ countries, ranging from 80.9% of girls only reaching Category 1 in Malawi, to 21.9% reaching Category 4 in Seychelles. The variation for boys ranged from 75.5% performing in Category 1 in Malawi to 11.4% of boys performing in Category 4 in Seychelles.

When examining each category, it can be observed that among girls that reached Category 2, the variation ranged from 63.8% in Mozambique to 18% in Malawi, while for boys in the same category the variation ranged from 63% in Swaziland to 18.8% in Namibia. For Category 3, the variation ranged from 41.8% in Seychelles to 0.8% in Malawi, whilst for both girls and boys the variation ranged from 42.5% in Tanzania to 2% in Malawi. Boys (11.4%) and girls (21.9%) reached the highest category in Seychelles. In Mozambique only 0.2% boys and in Lesotho 0.2% of girls and 0.3% boys reached Category 4 while in Mozambique (0% of girls) Malawi (0% and 0%), and Zanzibar (0 and 0%) were the countries where pupils did not reach Category 4.

Pupil performances in reading by socio economic status in SACMEQ countries

Figure 8.12 shows SACMEQ pupil performance in reading according to socio-economic status (see Appendix 35).



	BOT	KEN	LES	MAL	MAU	MOZ	NAM	SEY	SOU	SWA	TAN	UGA	ZAM	ZAN	SAC
Read Low SES	503	525	449	423	508	511	422	562	440	519	529	472	424	468	482
Read High SES	544	578	455	441	555	523	486	594	544	541	575	496	457	492	520

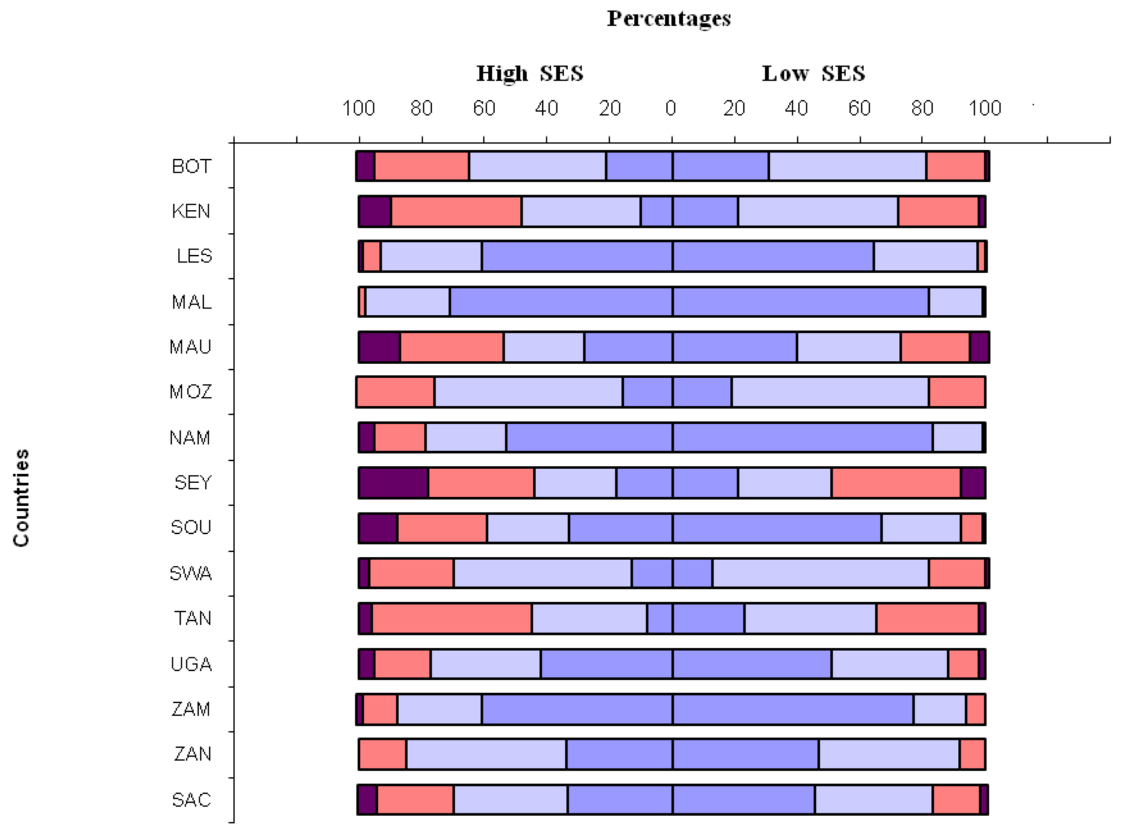
Countries

Source: Data from SACMEQ database, 2004

*Figure 8.12 M*ean scores of reading pupils of SACMEQ countries by socio-economic status

Figure 8.12 shows that, on average, pupils from a low SES had 482.4 points in reading, while pupils from a high SES had 519.9. This figure demonstrates that in the SACMEQ countries, on average, pupils from a low SES scored much lower in reading than pupils from a high a SES. In reading, the variation among countries ranged from 421.5 points in Namibia to 561.8 in Seychelles for pupils from a low SES. For pupils from a high SES, the variation ranged from 440.7 in Malawi to 594.4 in Seychelles.

Figure 8.13 shows percentages of pupil performance at different levels of reading competency in SACMEQ countries by socio-economic status (see Appendix 36 for more details).



	SAC	ZAN	ZAM	UGA	TAN	SWA	SOU	SEY	NAM	MOZ	MAU	MAL	LES	KEN	BOT
1 Pre/Emergent/Basic reading (L)	46	47	77	51	23	13	67	21	83	19	40	82	64	21	31
2 R. Meaning/Interpretative reading (L)	38	45	17	37	42	69	25	30	16	63	33	17	33	51	50
3 Inferential/analytical reading (L)	15	8	6	10	33	18	7	41	1	18	22	1	3	26	19
4 Critical reading (L)	2	0	0	2	2	1	1	8	0	0	6	0	0	2	1
1 Pre/Emergent/Basic reading (H)	33	34	61	42	8	13	33	18	53	16	28	71	61	10	21
2 R. Meaning/Interpretative reading (H)	37	51	27	35	37	57	26	26	26	60	26	27	32	38	44
3 Inferential/analytical reading (H)	24	15	11	18	51	27	29	34	16	25	33	2	6	42	30
4 Critical reading (H)	6	0	2	5	4	3	12	22	5	0	13	0	1	10	6

Source: Data from SACMEQ database, 2004

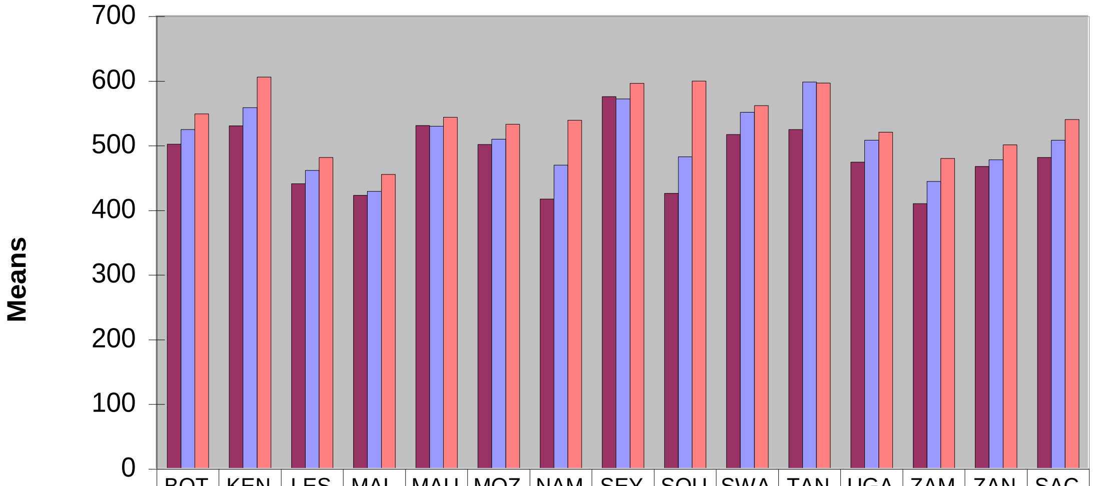
Figure 8.13 Percentage of pupils' reading categories in SACMEQ countries by socio-economic status

In Figure 8.13 above, it can be seen that pupils in all SACMEQ countries from a higher SES have reached higher categories in reading than pupils from low SES. On average, 33.5% and 45.5% of pupils from a higher SES and a lower SES respectively performed at Category 1, and 36.5% and 37.8% of pupils from a higher SES and from a lower SES respectively reached Category 2, while 24.1% and 15.0% of pupils from a higher SES and from a lower SES reached Category 3. Finally, 6.1% of pupils from a higher SES and 2.1% from a lower SES reached Level 4.

Among pupils from a higher SES, Seychelles was the only country where pupils (21.8%) reached Category 4, while from a lower SES, 8.3% of pupils from Seychelles reached Category 4. For pupils from a higher SES that performed in Category 1, the variation ranged from 71.1% in Malawi to 7.9% in Tanzania, and among pupils from a lower SES, the variation ranged from 82.6% in Namibia to 13.4% in Swaziland. Among pupils from a higher SES that reached Category 2, the variation ranged from 59.7% in Mozambique and 26.7% in Malawi, while for pupils from a lower SES in the same category the variation ranged from 68.7% in Swaziland to 15.8% in Namibia. In Category 3, the variation ranged from 42.4% in Kenya to 2.2% in Malawi for pupils from a higher SES and for pupils from a lower SES the variation ranged from 40.7% in Seychelles to 1% in Malawi.

Pupil performances in reading by school location in SACMEQ countries

Figure 8.14 shows the mean performance of pupils in reading according to school location (see Appendix 37).



	BOT	KEN	LES	MAL	MAU	MOZ	NAM	SEY	SOU	SWA	TAN	UGA	ZAM	ZAN	SAC
Read Isolated/rural	502.4	530.8	441.3	423.5	531.3	502.3	417.6	576.1	426.6	517.8	525.1	475	410.6	468.3	482
Read Small town	525.5	559	461.9	429.8	530.3	510.5	470.3	572.6	482.9	552.2	598.6	508.8	444.9	478.4	508.9
Read Large town	549.6	606.4	482.1	455.8	544.3	533.3	539.7	596.7	600.4	562.2	597.2	520.9	480.5	501.8	540.7

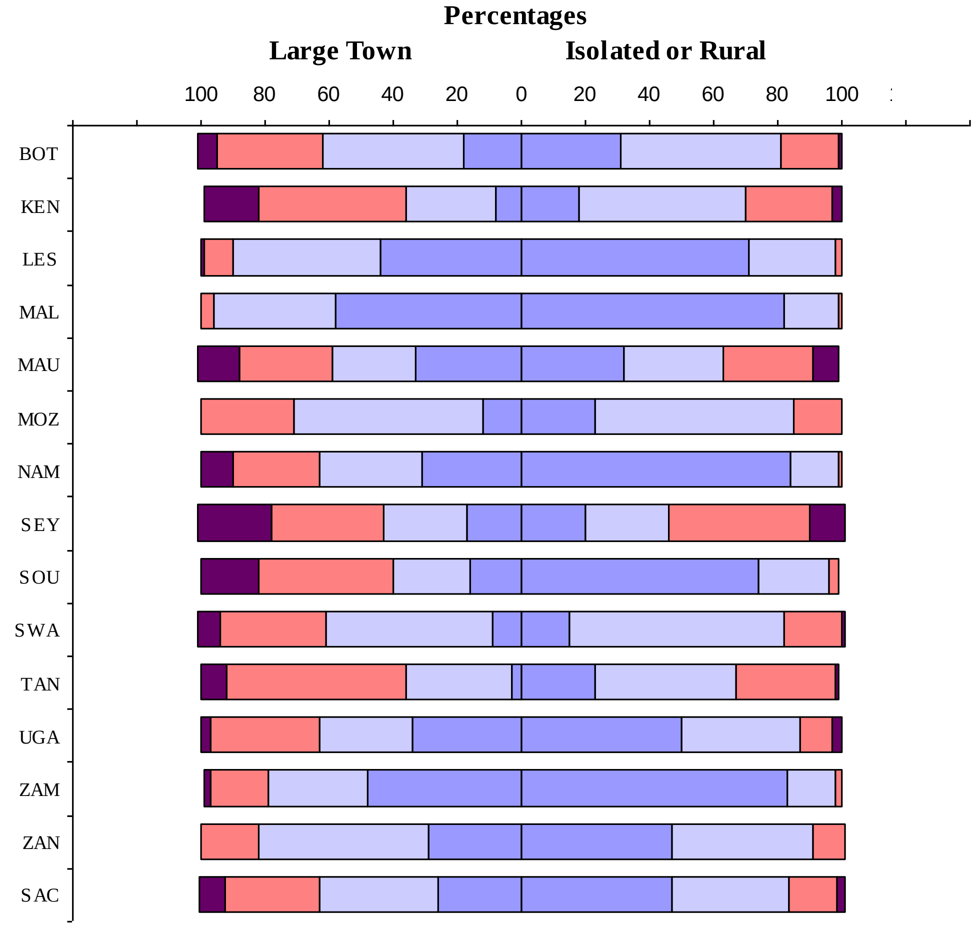
Countries

Source: Data from SACMEQ database, 2004

Figure 8.14 Mean scores of reading pupils in SACMEQ countries by school location

From the analysis in Figure 8.14 above, it can be observed that in reading, on average, pupils from isolated/rural areas in the SACMEQ countries had a mean of 482 points, those from small towns had a 508.9 mean, while pupils from large towns had a 540.7 mean. On average, pupils from isolated/rural and small towns in the SACMEQ countries had much lower mean performances in reading and mathematics than pupils from large towns. This pattern was apparent in all countries apart from Mauritius and Seychelles where pupils from isolated or rural areas performed better in reading than pupils from small towns. In Tanzania, pupils from small towns had better performance in reading than pupils from large towns. In the isolated/rural areas, the variation in average performances for reading among countries ranged from 410.6 in Zambia to 576.1 in Seychelles, in small towns the variation ranges from 429.8 in Malawi to 598.6 in Tanzania, while for pupils from large towns the variation ranges from 455.8 in Malawi to 600.4 in South Africa.

Figure 8.15 shows the percentages for reading results by school location (see Appendix 38).



	SAC	ZAN	ZAM	UGA	TAN	SWA	SOU	SEY	NAM	MOZ	MAU	MAL	LES	KEN	BOT
4 Critical reading (LT)	8	0	2	3	8	7	18	23	10	0	13	0	1	17	6
3 Inferential/analytical reading (LT)	30	18	18	34	56	33	42	35	27	29	29	4	9	46	33
2 R. Meaning/Interpretative reading (LT)	37	53	31	29	33	52	24	26	32	59	26	38	46	28	44
1 Pre/Emergent/Basic reading (LT)	26	29	48	34	3	9	16	17	31	12	33	58	44	8	18
4 Critical reading (I/R)	3	0	0	3	1	1	0	11	0	0	8	0	0	3	1
3 Inferential/analytical reading (I/R)	15	10	2	10	31	18	3	44	1	15	28	1	2	27	18
2 R. Meaning/Interpretative reading (I/R)	36	44	15	37	44	67	22	26	15	62	31	17	27	52	50
1 Pre/Emergent/Basic reading (I/R)	47	47	83	50	23	15	74	20	84	23	32	82	71	18	31

Figure 8.15 Percentage of pupils' reading categories in SACMEQ countries by school location

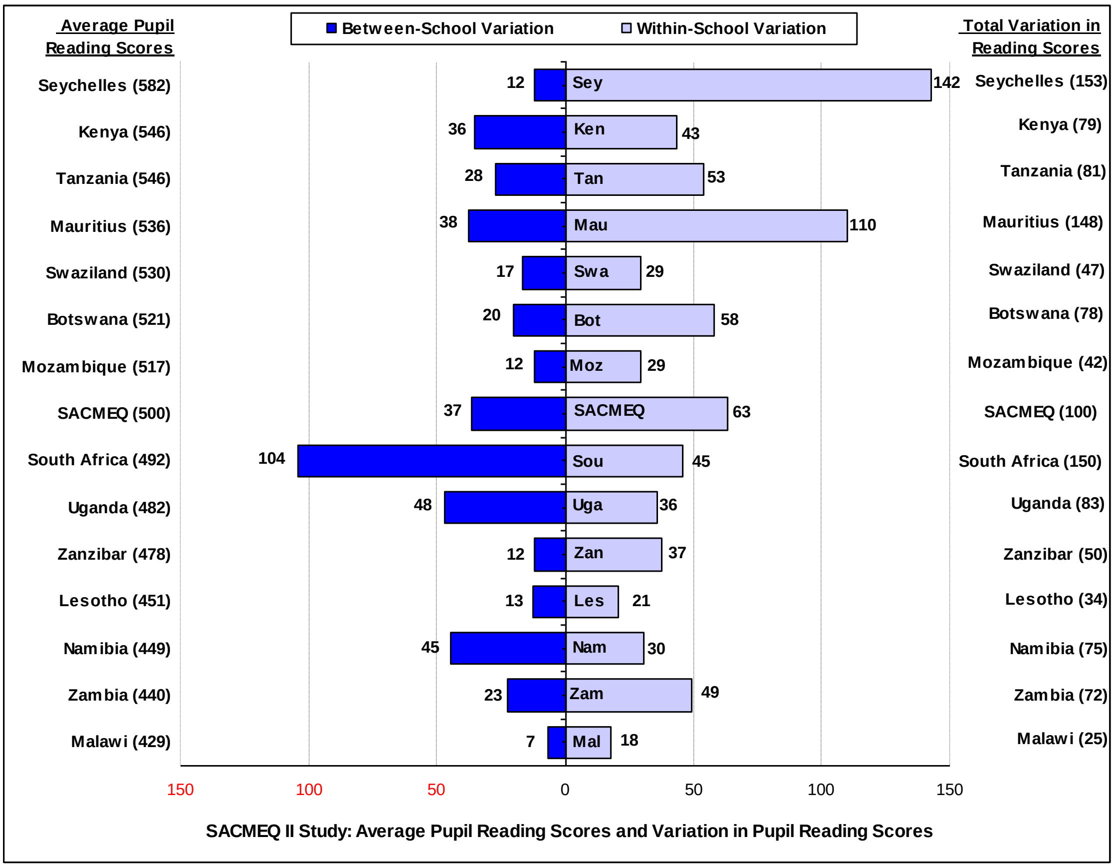
The different categories of competence are presented in Figure 8.15 above, according to the school location. Two variables were selected for this analysis: isolated or rural areas, and large towns. In all SACMEQ countries, pupils living in large towns reached higher categories of performance than pupils living in isolated or rural areas. In terms of means reached by pupils in the two areas, it can be observed from the figure that on average 25.6% of pupils from large towns and 46.6% from isolated or rural areas reached Category 1. Some 36.9% pupils from large towns and 36.3% from isolated or rural areas reached Category 2, while 29.5% of pupils from large towns and 14.9% from isolated areas reached Category 3. Finally, 8% of pupils from large towns and 2.5% from isolated or rural areas reached Level 4.

Some 22% of pupils in large towns in the Seychelles reached Category 4, whereas no learners in Malawi and Mozambique reached the same level. In isolated or rural areas, 11% of pupils in Seychelles and no pupils in Malawi, Mozambique and Namibia reached Category 4.

Pupils from large towns that reached Category 1 vary from 58.3% in Malawi to 3.1% in Tanzania, and among pupils from isolated or rural areas, the variation ranged from 84.2% in Namibia to 14.7% in Swaziland. Among pupils from large towns that reached Category 2, the variation ranged from 59% in Mozambique to 23% in South Africa, while for pupils from isolated or rural areas in the same category the variation ranged from 67.2% in Swaziland to 15.1% in Namibia and Zambia. In Category 3, the variation ranged from 56.2% in Tanzania to 4.4% in Malawi for pupils from large towns, and for pupils from isolated or rural areas the variation ranged from 43.5% in Seychelles to 0.6% in Malawi.

Variation in reading performance in the SACMEQ countries between schools and within schools

Figure 8.16 presents the between-school and within-school variation in reading performance in SACMEQ countries. The left-hand column of Figure 8.16 presents the average of pupils' performance in reading in SACMEQ countries, which has already been presented and discussed earlier in this chapter. The right-hand column shows the total variation in pupils' reading scores in SACMEQ countries. The bars on the left show the variation among schools, while the bars on right show the variation within schools. The total variation was 100 in the SACMEQ countries as a whole.



Source: Dolata, Ikeda and Murimba, 2004

Figure 8.16 Average of pupils' reading scores and variation in pupils' reading scores in SACMEQ countries

The total variation among SACMEQ countries ranges from 25 in Malawi to 153 in Seychelles. South Africa, Mauritius and Seychelles were the countries that present a total variation higher than the SACMEQ variation (100). Taking into account the variation within schools, it can be observed that Seychelles (142) is the SACMEQ country that presents the biggest variation, followed by Mauritius (110), while Malawi (18), Lesotho (21), Mozambique (29) and Swaziland (29) were the countries that present the smallest variation within schools.

In terms of the variation between schools, it can be observed in Figure 8.16 that South Africa (104) was the country that had the biggest variation between schools, followed by Uganda (48) and Namibia (45), while Malawi (7) had the smallest variation, followed by Seychelles, Mozambique and Zanzibar with a school variation of 12. Mauritius, Namibia and Uganda were the school systems in which the variation between schools was higher than in SACMEQ countries as a whole, where the variation within schools was 63 and between schools was 37.

8.2 TEACHER AND PUPIL PERFORMANCE IN MATHEMATICS IN SACMEQ II TESTS IN MOZAMBIQUE AND IN SACMEQ COUNTRIES

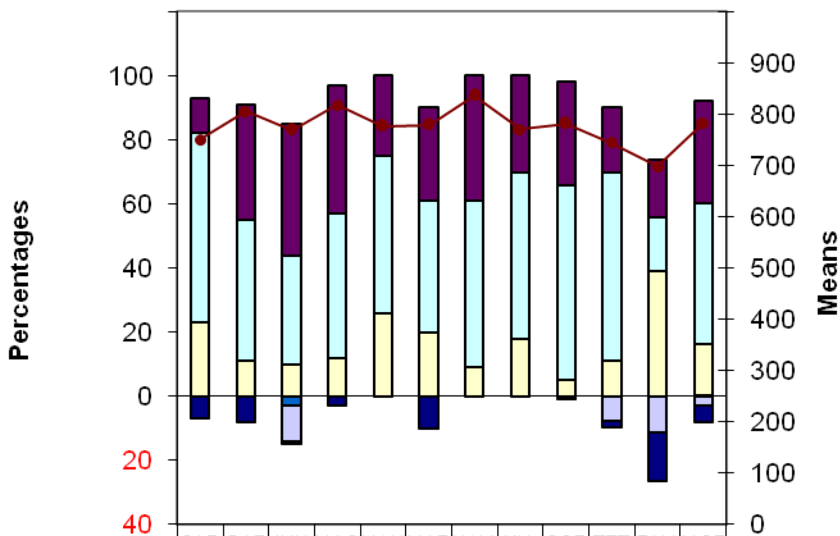
Teachers and pupil performance in mathematics in Mozambique and in other SACMEQ countries is presented analysed and discussed in this section at national, provincial level and regional level.

8.2.1 Teacher and Pupil Performance in Mathematics in Mozambique and in SACMEQ Countries

As with the previous section describing teacher and pupil performance in reading, the following section presents, analyses and discusses teacher and pupil performance in mathematics firstly in Mozambique, and then in SACMEQ countries.

Teacher performance in mathematics in Mozambique

Figure 8.17 shows the percentage and means for mathematics test scores of Grade 6 teachers in Mozambique (see Appendix 39 for more information).



	CAB	GAZ	INH	MAC	MAN	MAP	NAM	NIA	SOF	TET	ZAM	MOZ
8 Abstract Problem solving	11	36	41	40	25	29	39	30	32	20	18	32
7 Problem solving	59	44	34	45	49	41	52	52	61	59	17	44
6 Mathematically skilled	23	11	10	12	26	20	9	18	5	11	39	16
5 Competent numeracy	7	8	1	3	0	10	0	0	1	2	15	5
4 Beginning numeracy	0	0	11	0	0	0	0	0	0	8	11	3
3 Basic numeracy	0	0	3	0	0	0	0	0	0	0	0	0
2 Emergent numeracy	0	0	0	0	0	0	0	0	0	0	0	0
1 Pre-numeracy	0	0	0	0	0	0	0	0	0	0	0	0
Mean	751	806	769	818	777	779	837	770	782	745	698	783

Provinces

Source: SACMEQ database, 2004

Figure 8.17 Percentage of teachers, mean scores and attained mathematics levels of Mozambican mathematics teachers

In terms of the national average (782.8), the mathematics teachers fell 217.2 points below the maximum score of 1000 and 8.9 points above the SACMEQ mean. Some variations between provinces were recorded, with scores ranging from 837.1 in Nampula to 697.9 in Zambézia. Nampula province had the best teacher performance in Mathematics (837.1), followed by Maputo Cidade (817.6) and Gaza province (805.7).

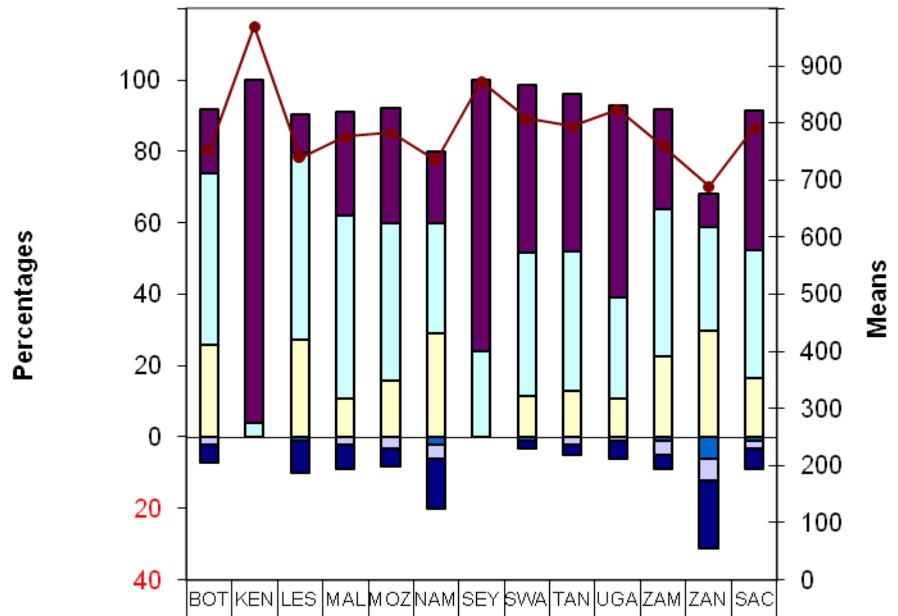
Examining the levels reached by mathematics teachers, it can be seen that 7.8% of the mathematics teachers in Mozambique reached between Levels 3 (basic numeracy) and 5 (competent numeracy). Some 16% of the teachers performed at Level 6, meaning that they can be regarded as "mathematically skilled." Only 31.7% of pupils were taught by teachers who performed at Level 8. Those teachers who reached the highest level of performance in the test, Level 8, which involves "abstract problem solving," varied from 10.6% in Cabo Delgado to 40.8% in Inhambane.

Comparing the performance outcomes of the teachers of mathematics and reading, it can be seen that more than half (52%) of Mozambican reading teachers reached the highest level (Level 8, “critical reading”) while only a third (32%) of mathematics teachers reached the highest level. However, mathematics teachers achieved a higher mean of 783 in comparison with the reading teachers’ mean of 716. Inhambane province had 41% of its mathematics teachers reach Level 8, the highest percentage in the country, while only 36% of the province’s reading teachers reached Level 8. Two provinces recorded vast differences between the performance of teachers who reached Level 8 for reading and Level 8 for mathematics. Maputo Province recorded 71.7% for reading and 28.8% for mathematics, and in Cabo Delgado 48.5% was recorded for reading and 10.6% for mathematics. However, in the rest of the provinces the percentage of reading teachers reaching the highest levels was greater than the percentage of mathematics teachers who reached the highest levels.

Taking into consideration that the performance of mathematics teachers was conceptually weaker than that of reading teachers in terms of the levels reached by the teachers, it may be assumed that the mathematics performance of their pupils would be influenced by teacher performance in a similar manner to reading (see Sections 8.1.1, 8.1.2, 8.2.1 and 8.2.2).

Teacher performances in mathematics in SACMEQ countries

Figure 8.18 shows the percentage and means of the achievement of mathematics teachers in all SACMEQ countries (see Appendix 40). It can be seen that the average teacher’s score for mathematics in the SACMEQ countries was 791.7, which was 208.3 points below the maximum score. There were some variations between countries, ranging from the lowest mean score of 689.3 in Zanzibar, which was 102.4 points below the SACMEQ II mean, to the highest of 968.5 in Kenya, 176.8 points above the SACMEQ II mean. Mathematics teachers in Kenya, the Seychelles, Swaziland, Tanzania and Uganda performed above the SACMEQ II mean while mathematics teachers in the remaining countries performed below the SACMEQ II mean.



	BOT	KEN	LES	MAL	MOZ	NAM	SEY	SWA	TAN	UGA	ZAM	ZAN	SAC
8 Abstract Problem solving	18	96	11	29	32	20	76	47	44	54	28	9	39
7 Problem solving	48	4	52	51	44	31	24	40	39	28	41	29	36
6 Mathematically skilled	26	0	28	11	16	29	0	12	13	11	23	30	17
5 Competent numeracy	5	0	9	7	5	14	0	2	3	5	4	19	6
4 Beginning numeracy	2	0	0	2	3	4	0	0	2	1	4	6	2
3 Basic numeracy	0	0	1	0	0	2	0	1	0	0	1	6	1
2 Emergent numeracy	0	0	0	0	0	0	0	0	0	0	0	0	0
1 Pre-numeracy	0	0	0	0	0	0	0	0	0	0	0	0	0
Mean	753	969	739	776	783	735	873	808	794	823	759	689	792

Countries

Source: Data from SACMEQ database, 2004

Figure8.18 Percentage of teachers' mean scores and attained mathematics levels of regional mathematics teachers

In terms of levels reached by mathematics teachers, it can be observed from the results that in the SACMEQ countries, 8.9% of pupils were taught by teachers who managed to perform only between Level 3 ("basic numeracy") and Level 5 ("competent numeracy"), but 35.8% of pupils were taught by teachers who reached the "mathematically skilled" Level 6, while just over a third (38.6%) of teachers reached the highest level of 8, which involves "abstract problem solving".

The percentage of mathematics teachers that reached Level 8 vary and ranged from 9.3% in Zanzibar to 95.6% in Kenya. Zanzibar was a country with the highest percentage of pupils (31.8%) that had teachers who only managed to perform between Levels 3 and 5, followed by Namibia at 19.9% and Lesotho at 10.3%. The situation in these countries is therefore quite worrying, as this large percentage of sub-optimally skilled teachers can impact negatively on pupil achievement. Kenya had the highest mathematics teacher performance, followed by the Seychelles (75.9%) and

Uganda (54.2%), with less than 50% of teachers performing at Level 8 in the remaining countries. In fact, Kenya and the Seychelles were the only countries where mathematics teachers reached Levels 7 and 8, the ability to problem solve both concretely and abstractly.

Kenya was the only country that had a higher percentage of mathematics teachers (95.6%) who reached Level 8 than reading teachers (93.5%). In the remaining countries, the percentage of mathematics teachers who reached Level 8 is lower than the percentage of reading teachers who reached Level 8. Botswana (82%; 18.4%), Zambia (82.4%; 28.3%) and Lesotho (59.8%; 10.6%) were the three countries where the difference between the performances of reading teachers who reached Level 8 is substantial. It is interesting to note that those particular countries used the same teacher to teach both of the subjects. Possibly the difference in terms of performance is related to the level of subject knowledge required to teach the subject. The Ministries of Education in those countries need to conduct research to find out the reasons for these differences in terms of teacher performance in reading and mathematics.

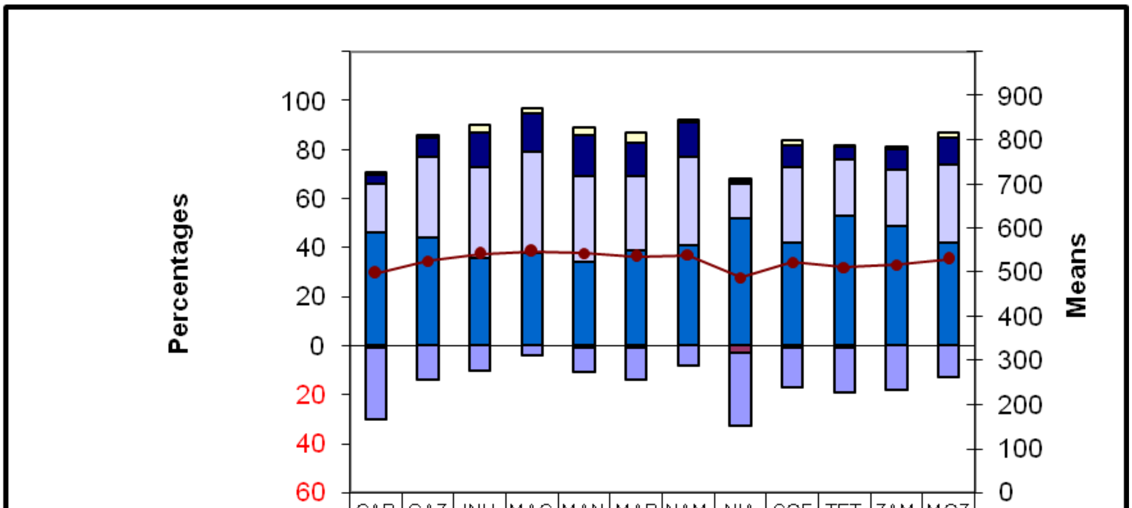
Despite the higher mean reached by mathematics teachers (791.7) in comparison with the mean reached by reading teachers (733.8), the percentage of pupils taught by teachers that reached Level 8 in each subject was higher for reading teachers than for mathematics teachers. For instance, 64.9% of pupils were taught by reading teachers who performed at Level 8 in contrast to 38.6% of pupils who were taught by mathematics teachers performing at Level 8. The difference in terms of teacher performance may have influenced the pupil performance, as can be seen later in this chapter, when analysis of the pupil performance for these two subjects is presented.

Comparing the results summarized in Figures 8.1, 8.2, 8.17 and 8.18, it can be observed that the performance of reading and mathematics teachers indicates the need to improve teachers' subject knowledge, particularly in mathematics. However, it is important to stress that just as seen in Mozambique, there is a need to improve the subject knowledge of teachers in SACMEQ countries in order to provide a good foundation with solid subject knowledge for teaching and learning in primary schools.

As seen in the Mozambican results, teacher performance in reading and mathematics tests in SACMEQ countries tends to indicate the need for better selection criteria for teacher training programmes. The examination to select candidates must include subject knowledge assessment and investigation into mastery of primary education content to ensure that the candidate has the knowledge required to teach successfully in primary education. It is important to take into consideration that the purpose of a teacher training course is to provide professional training for teachers in terms of Psycho-Pedagogics and Didactics rather than to provide academic knowledge, which is the purpose of primary and secondary schools in laying down the foundation for academic knowledge. However, if the required subject knowledge were lacking, it would be necessary for teacher training colleges to organize extra sessions to improve and extend the subject knowledge of primary education student teachers and then assess this acquisition and development. Therefore, if teachers do not have the knowledge of each subject it is not possible to teach at primary level (Shulman, 1986). To be an effective teacher, the candidate must demonstrate competency in primary education subjects. Primary school subject knowledge is therefore a prerequisite for entry into a teacher training course. However, the combination of subject knowledge and professional training is important to ensure the training of effective teachers and successful teaching and learning in schools.

Pupil performance in Mathematics in Mozambique

The means and the percentages of pupils reaching each of the eight mathematics competency levels have been presented in Figure 8.19 (see Appendix 41).



	CAB	GAZ	INH	MAC	MAN	MAP	NAM	NIA	SOF	TET	ZAM	MOZ
8 Abstract Problem solving	0	0	0	0	0	0	0	0	0	0	0	0
7 Problem solving	0	0	0	0	0	0	0	0	0	0	0	0
6 Mathematically skilled	1	1	3	2	3	4	1	1	2	1	1	2
5 Competent numeracy	4	8	14	16	17	14	14	1	9	5	8	11
4 Beginning numeracy	20	33	37	41	35	30	36	14	31	23	23	32
3 Basic numeracy	46	44	36	38	34	39	41	52	42	53	49	42
2 Emergent numeracy	29	14	10	4	10	13	8	30	16	18	18	13
1 Pre-numeracy	1	0	0	0	1	1	0	3	1	1	0	0
Mean	498	526	541	547	543	535	539	488	523	511	517	530

Source: SACMEQ database (2004)

Figure 8.19 Percentage of pupils' mean scores and attained mathematics levels of Mozambican mathematics pupils

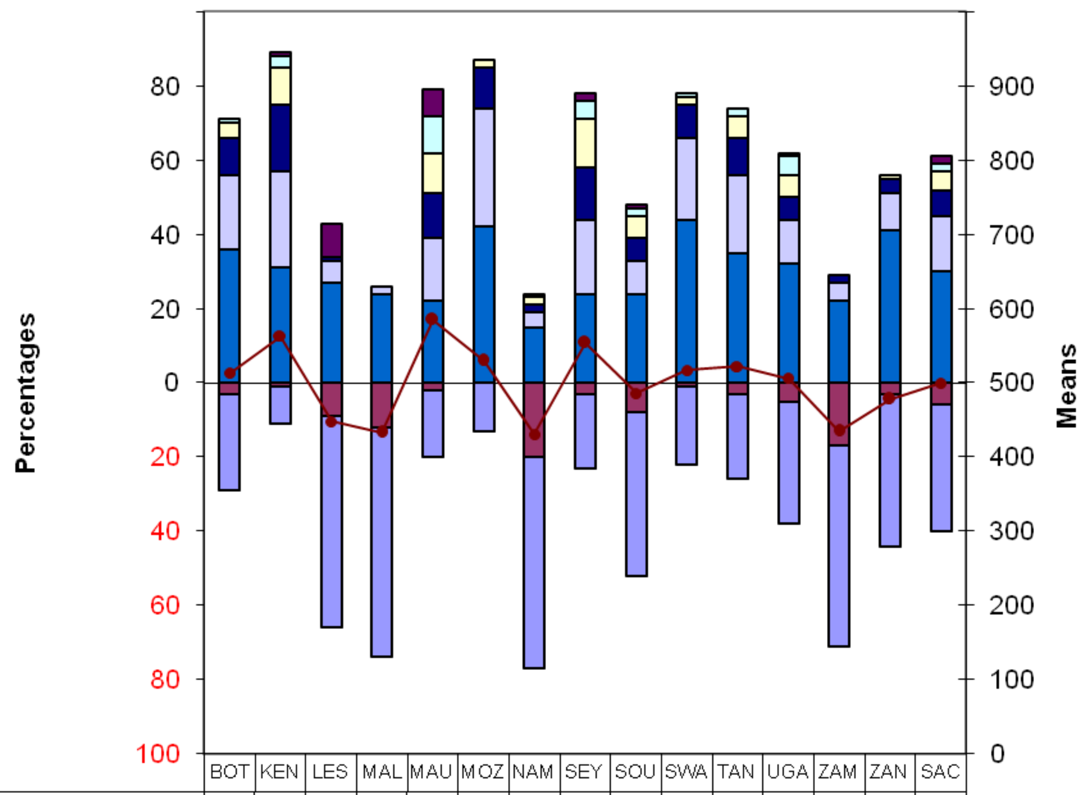
According to the adopted definition, (see, Section 8.1.1) all pupils that performed below Level 3 were considered numerically illiterate. Some 13% of the pupils in Mozambique performed at or below this level, and must therefore be considered numerically illiterate. Figure 8.19 illustrates that the Mozambican overall average of pupil performance in mathematics was 530, 30 points above the SACMEQ mean, but 470 points below the maximum score. There were some variations among the provinces, ranging from 488.2 in Niassa to 546.5 in Maputo Cidade. Inhambane (540.9), Maputo Cidade, (546.5), Manica (543.4), Maputo Provincia (534.7) and Nampula (539.2) were the provinces that performed above the country's mean. The rest of the provinces performed below the country's mean while Niassa (488.2) and Cabo Delgado (497.9) performed below the SACMEQ mean (500).

Just as in reading, the Mozambican pupils did not achieve Level 8 of "abstract problem solving" in mathematics, but 1.8% of pupils performed at Level 6 and 7. Some (41.7%) of pupils in Grade 6 reached Level 3 ("basic numeracy") and 32.1% reached Level 4 ("beginning numeracy"). However, more than half of the pupils in Grade 6 (54.7%) performed between Levels 1 and 3. There were some variations among provinces with Niassa (84.1%) and Cabo Delgado (75.8%) having the highest percentage of pupils who performed between Levels 1 and 3. The majority (41.7%) of Grade 6 pupils mastered Level 3. Maputo Cidade had the highest (41.1%) percentage of pupils that reached Level 4.

These results need special attention from the Ministry of Education and Culture and the curriculum needs to be scrutinised to ensure that abstract thinking is a skill that is developed at the primary school level. If Grade 6 pupils are unable to perform at high levels such as Levels 6, 7 and 8, which involve the development of mathematical skills, problem solving and abstract problem solving, both the curriculum and the teacher training programmes need to be adapted to incorporate the teaching and learning of these advanced skills. In addition, the SACMEQ II study reveals that 78.2% of pupils in Grade 6 in Mozambique in 2000 had repeated a grade during their school careers. The stringent selection system means that only the best performers were able to reach Grade 6. However, even these pupils did not reach Level 7 and 8 in the mathematics tests. The results, therefore, suggest that the MEC has to investigate ways to improve mathematical performance.

Pupil performance in mathematics in SACMEQ countries

Figure 8.20 presents the means and the percentages of pupils reaching each of the eight mathematics competency levels (see Appendix 42 for details).



	BOT	KEN	LES	MAL	MAU	MOZ	NAM	SEY	SOU	SWA	TAN	UGA	ZAM	ZAN	SAC
8 Abstract Problem solving	0	1	9	0	7	0	0	2	1	0	0	1	0	0	2
7 Problem solving	1	3	0	0	10	0	1	5	2	1	2	5	0	0	2
6 Mathematically skilled	4	10	0	0	11	2	2	13	6	2	6	6	0	1	5
5 Competent numeracy	10	18	1	0	12	11	2	14	6	9	10	6	2	4	7
4 Beginning numeracy	20	26	6	2	17	32	4	20	9	22	21	12	5	10	15
3 Basic numeracy	36	31	27	24	22	42	15	24	24	44	35	32	22	41	30
2 Emergent numeracy	26	10	57	62	18	13	57	20	44	21	23	33	54	41	34
1 Pre-numeracy	3	1	9	12	2	0	20	3	8	1	3	5	17	3	6
Mean	513	563	448	433	585	530	431	554	486	517	522	506	435	478	500

Countries

Source: Data from SACMEQ database, 2004

Figure 8.20 Percentage of pupils' mean scores and attained mathematics levels of SACMEQ countries

The average of pupils' overall performance in mathematics in all of the SACMEQ countries was 500. As indicated in Figure 8.20, some variations were observed among the countries, ranging from 430.9 in Namibia to 584.6 in Mauritius. Mauritius (584.6), Kenya (563.3), Seychelles (554.3), Mozambique (530), Tanzania (522.4), Swaziland (516.5), Botswana (512.9) and Uganda were the countries that performed above the SACMEQ mean, with the remaining countries performing below the SACMEQ mean.

The percentage of pupils reaching the various levels of competency in Mathematics is presented in the same figure. Almost three quarters (70.1%) of pupils in Grade 6 in the SACMEQ countries performed between Levels 1 (pre-numeracy) and 3 (basic numeracy). Remembering that at Level 4 pupils are at the stage of "beginning numeracy," one realises that 70.1% of pupils performing below this level will not have mastered beginning numeracy skills. Only 1.5% of Grade 6 pupils reached Level 8, the "abstract problem solving" level.

Some 22% of pupils reached Level 4 (beginning numeracy) and Level 5 (competent numeracy) while 6.6% reached Levels 6 (mathematically skilled) and Level 7 (problem solving). Mauritian pupils had the highest percentage of pupils that reached Levels 7 (10.4%) and 8 (7%). Figure 8.20 shows that the lowest percentages are observed at Levels 1, 5, 6, 7 and 8 and the highest percentages at Levels 2 and 3. The percentages begin to increase at Level 2 and to decline at Level 5.

There were some variations amongst the various countries. Malawi (97.8%), Zambia (92.7%), Lesotho (92.7%), Namibia (91.5%), Zanzibar (85.2%) and South Africa (76%) recorded the highest percentage of pupils that performed at Levels 1 and 3. Apart from Zanzibar, the same countries that recorded lower performance in reading also recorded lower performance in mathematics. This phenomenon needs to be examined in detail by the various Ministries of Education, taking into consideration the level of pupil performance required at Grade 6.

When comparing the SACMEQ pupil performance in reading and mathematics by country, it can be observed that pupils in Kenya, Lesotho, Malawi, Mauritius, Mozambique and Uganda performed more poorly in reading than in mathematics. This is in contrast to the rest of the countries, whose pupils performed better in reading than in mathematics.

In terms of the achieved levels, pupils generally reached higher levels in reading than in mathematics. For instance, if information is combined and grouped into four levels for each of reading and mathematics the following picture emerges:

Categories	**% of pupils performing within each category**	
	Reading (%)	**Mathematics (%)**
1	40.0	70.1
2	37.0	22.0
3	19.0	6.6
4	3.7	1.5

The majority of the pupils in the two subjects performed within Categories 1 (40%; 70.1%) and 2 (37%; 22%) respectively in reading and mathematics and 3.7% of pupils in reading and 1.5% percent in mathematics achieved performance in Category 4.

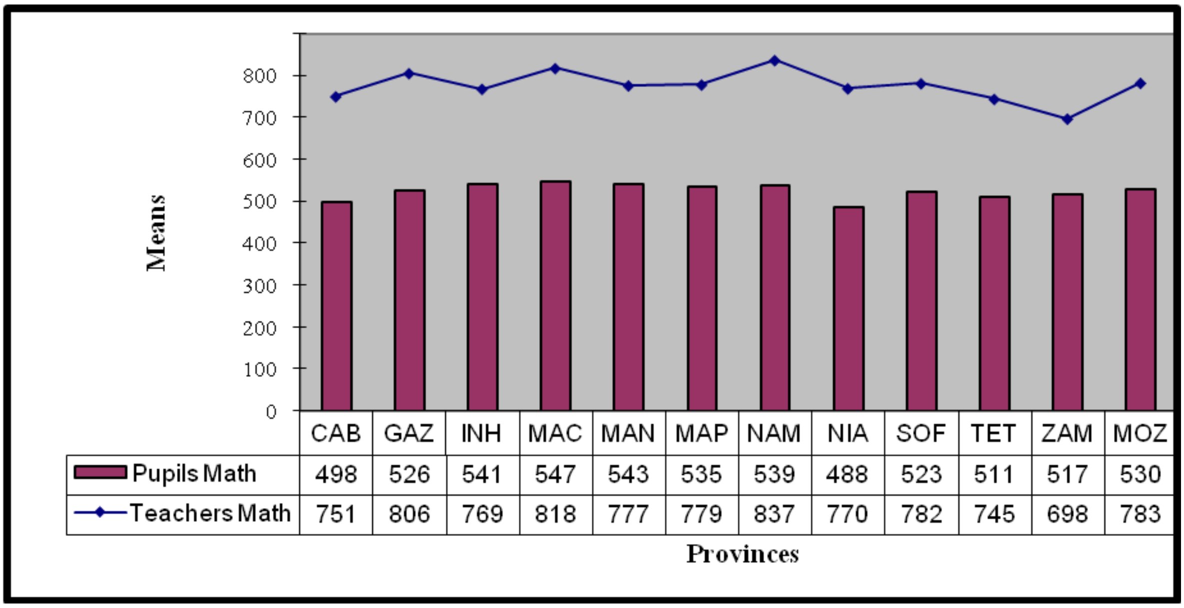
Reading is a determinant for pupil performance in other subjects in primary education. In mathematics, problem solving implies two kinds of knowledge. Firstly, it involves reading, interpretation and understanding, and then, secondly, it requires mathematical knowledge to solve the problem. Sometimes mathematical difficulties are related to language problems rather than mathematics itself. As evidence, a study carried out in India shows that "there was a positive association between the mean percentage score of districts in language and mathematics. The correlation between the two being 0.73. Thus, the districts with a high achievement level in mathematics also depict high achievement level in language" (Aggarwal, 2000, p. 9).

8.2.2 Teacher and Pupil Performances in Mathematics in Mozambique and in SACMEQ Countries

This section presents and discusses teacher and pupil performance in mathematics in Mozambique and in SACMEQ countries.

Teachers and pupil performances in mathematics in Mozambique

Figure 8.21 shows the percentage and means for mathematics test scores of Grade 6 teachers and pupils in Mozambique (see Appendix 43 for more information).



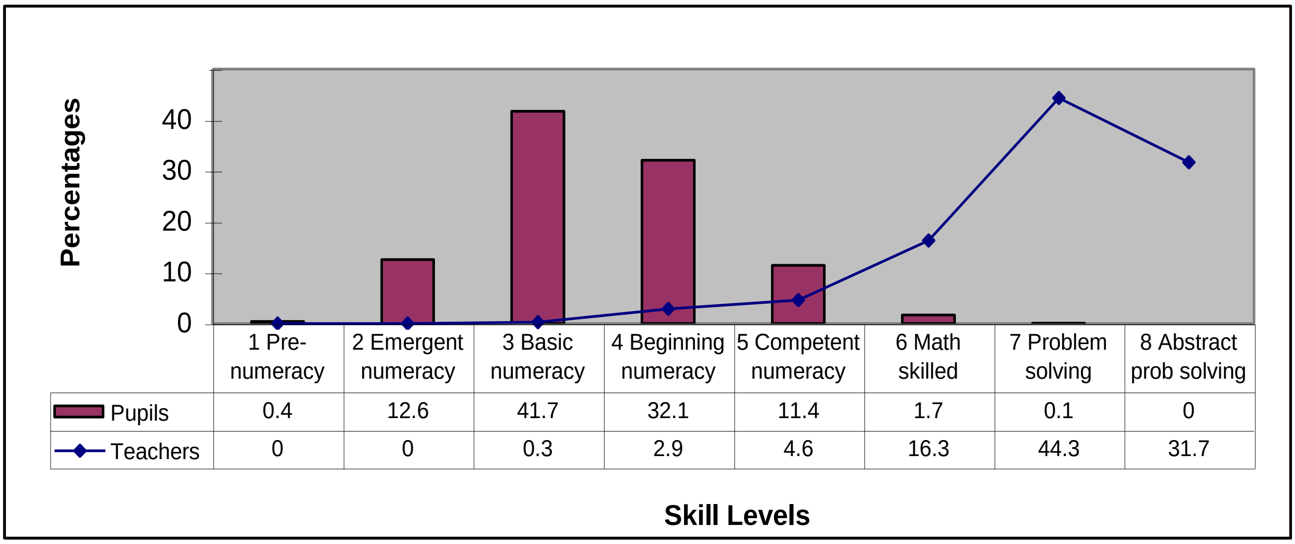
	CAB	GAZ	INH	MAC	MAN	MAP	NAM	NIA	SOF	TET	ZAM	MOZ
Pupils Math	498	526	541	547	543	535	539	488	523	511	517	530
Teachers Math	751	806	769	818	777	779	837	770	782	745	698	783

Source: Data from SACMEQ database, 2004

Figure 8.21 Mean scores of reading pupils and teachers in Mozambique

Figure 8.21 shows that on average teachers performed better in mathematics (782.8) than their pupils, who had 530 points in mathematics. A variation among provinces is seen, in comparing the differences between teachers and pupils' performance. The difference between teachers and pupils in terms of performance in mathematics, ranged from 181 in Zambézia to 298 in Nampula.

Figure 8.22 shows teachers and pupils' performance in the different mathematics competency levels in Mozambique (see Appendix 44).



Source: Data from SACMEQ database, 2004

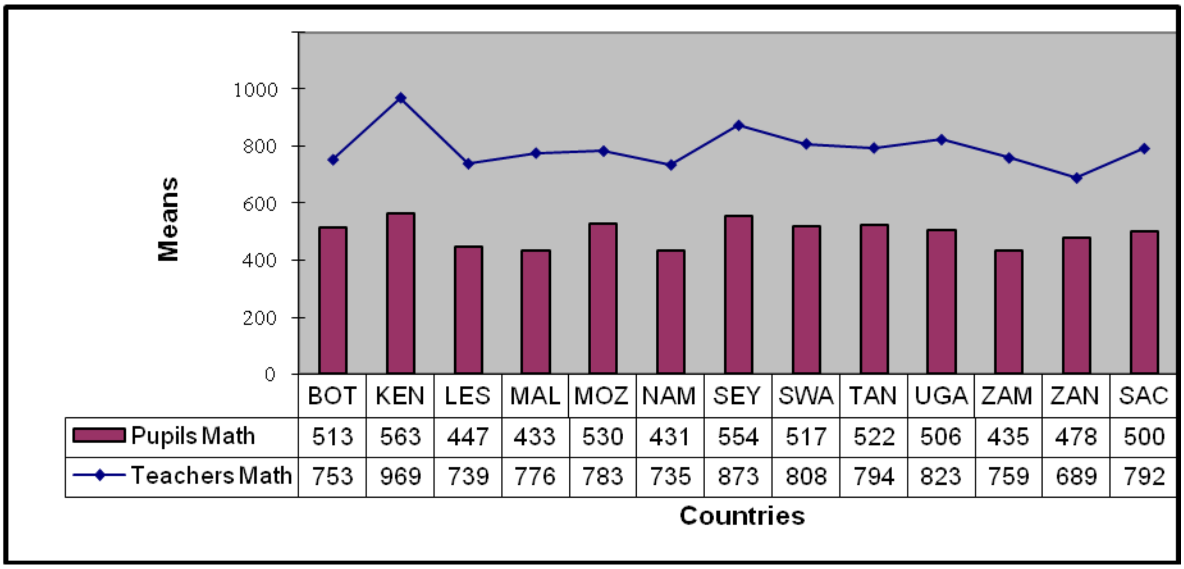
Figure 8.22 Percentage of Mozambican teachers and pupils' performance in mathematics at different levels of competency

Figure 8.22 presents pupils and teachers' performance in mathematics tests. Whereas pupils' performance decreased at Level 5, the teachers' performance increased significantly from Level 5 (competent numeracy) to Level 8 (abstract problem solving).

In the case of Mozambican pupils, the lowest percentages can be observed at Levels 1, 6, 7 and 8 and the highest percentages at Levels 3 and 4 (beginning numeracy). The percentages begin to increase at Level 2 and decline at Level 5. In the case of teachers, the lowest percentages can be observed at Levels 1, 2, 3, 4 and 5 and the highest percentages at Levels 7 (problem solving) and 8 (abstract problem solving).

Teacher and pupil performances in mathematics in SACMEQ countries

Figure 8.23 shows teacher and pupil performance in the different mathematics competency levels in SACMEQ countries (see Appendix 45).



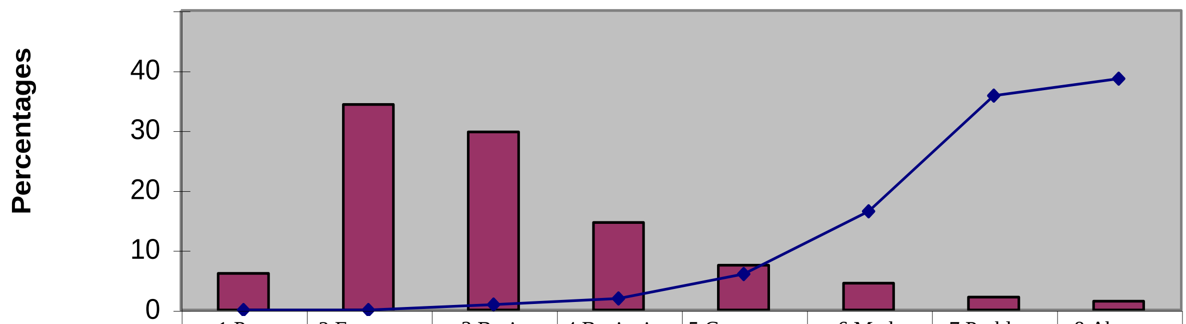
	BOT	KEN	LES	MAL	MOZ	NAM	SEY	SWA	TAN	UGA	ZAM	ZAN	SAC
Pupils Math	513	563	447	433	530	431	554	517	522	506	435	478	500
Teachers Math	753	969	739	776	783	735	873	808	794	823	759	689	792

Source: Data from SACMEQ database, 2004

Figure 8.23 Mean scores of reading pupils and teachers in SACMEQ countries

As in reading, teachers in the SACMEQ countries performed on average higher than their pupils, achieving a mean of 791.7 in mathematics. The variation in terms of pupil performance in mathematics ranged from 431 for pupils and 735 for in Namibia to 563 for pupil and 969 for teachers in Kenya.

Figure 8.24 shows teacher and pupil performance at different mathematics competency levels in the SACMEQ countries (see Appendix 46).



	1 Pre-numeracy	2 Emergent numeracy	3 Basic numeracy	4 Beginning numeracy	5 Competent numeracy	6 Math skilled	7 Problem solving	8 Abstract prob solving
Pupils	6.1	34.3	29.7	14.6	7.48	4.5	2.17	1.5
Teachers	0	0	0.9	1.9	6	16.5	35.8	38.6

Skill Levels

Source: Data from SACMEQ database, 2004

Figure 8.24 Percentage of SACMEQ teachers and pupils' performance in mathematics at different levels of competency

Figure 8.24 illustrates a similar pattern in that teacher performance in reading increases where pupil performance decreases. This result means that pupil performance decreased at Level 5 and teacher increased at Level 5 (competent numeracy).

In the case of pupils in the SACMEQ countries, the lowest percentages can be observed at Levels 1, 6, 7 and 8 and the highest percentages at Levels 2 and 3 (basic numeracy). The percentages begin to increase at Level 2 and decline at Level 5. In the case of teachers, the lowest percentages can be observed at Levels 1, 2, 3, 4 and 5 and the highest percentages at Levels 7 (problem solving) and 8 (abstract problem solving).

It was expected that teachers would perform better in the SACMEQ tests. Teacher performance varied from 654 to 969, with Kenyan teachers performing the best and the teachers from the remaining countries performing below 900.

Pupils and teachers performed better in mathematics than in reading, but their performance on the eight competency levels is higher in reading than in mathematics in both Mozambique and in the other SACMEQ countries**.** This result means that both pupils and teachers were able to solve more items in the mathematics test; however, although the mean for reading is lower, as pupils and teachers solved fewer items, they were able to reach higher competency levels in reading.

Figures 8.5, 8.7, 8.21 and 8.23 seem to show that when teachers achieved higher performance in the reading and mathematics tests, their pupils tended also to achieve a higher performance. When teachers achieved at a lower performance level, pupils tended to also only achieve at a lower level. This illustrates that in Mozambique as well as in SACMEQ countries, teacher and pupils *move together* (SACMEQ presentation, Passos, 2007) or that the teachers' performance mirrors that of their pupils.

It seems that the performance of pupils was determined by teacher performance in Mozambique as well as in other SACMEQ countries, because the pattern of teacher performance and the pattern of pupil performance generally followed a similar tendency. The results of the study have raised many issues that have serious implications for quality improvement in primary education. There is clear evidence to suggest that in SACMEQ countries, pupil performance levels tend to drop as the difficulty level increases. The results suggest that policies and interventions must be improved in order to close the poor performance of pupils and teachers in different levels of competency. Ministries of Education should therefore undertake continuous and comprehensive analysis of pupil and teacher performance at low and upper primary schools to address this concern. An integrated approach is required, to improve teacher and pupil performance and to take into account all of the variables involved, such as teacher training, assessment, inspection, and school conditions, just to mention a few.

8.2.3 Pupil Performance in Mathematics by Gender, Socio-economic Status and School Location in Mozambique and in SACMEQ Countries

In order to find out the impact of other factors on pupil performance, the following section presents and discusses pupil performance in mathematics by gender, socio-economic status and school location in Mozambique and in other SACMEQ countries.

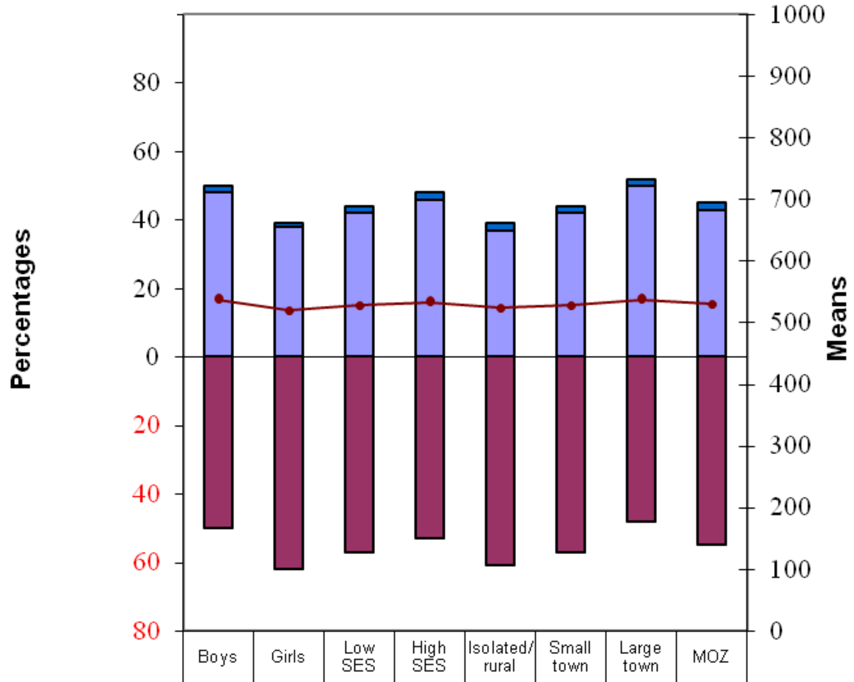
As in reading, to analyse the mathematics results relating to gender, socio-economic status and school location, the eight levels were reduced and combined into four categories, in accordance with the Mozambican marking scale, and will be classified as: Category 1 poor, Category 2 fair, Category 3 good, and Category 4 very good:

In mathematics, the categories are as follows:

Category 1 comprises Levels 1 "pre-numeracy", 2 "emergent numeracy" and 3 "basic numeracy"
Category 2 comprises Levels 4 "beginning numeracy" and 5 "competent numeracy"
Category 3 comprises Levels 6 "mathematically skilled" and 7 "problem solving"
Category 4 comprises Level 8 "abstract problem solving".

Pupil performance in mathematics by gender, socio-economic status and school location in Mozambique

Figure 8.25 shows the mathematics performance of pupils according to means and percentages in different levels of competency and according to their gender, socio-economic status and school location (more details in Appendix 47).



	Boys	Girls	Low SES	High SES	Isolated/ rural	Small town	Large town	MOZ
4 Abstract Problem solving	0	0	0	0	0	0	0	0
3 Math skilled/ Prob. Solving	2	1	2	2	2	2	2	2
2 Begin./Competent numeracy	48	38	42	46	37	42	50	43
1 Pre/Emergent/Basic numeracy	50	62	57	53	61	57	48	55
Mean	537	520	528	533	524	528	537	530

Source: SACMEQ database, 2004

Figure 8.25 Percentage of pupils' mean scores and attained mathematics categories of Mozambican mathematics pupils by gender, socio-economic status and school location

Figure 8.25 illustrates that all of the means in the three sub-groups were higher than the SACMEQ mean (500), but there were a few differences between them in terms of the means and the categories achieved by the pupils. The boys performed better than the girls (537; 519.5) in mathematics, and pupils from a higher SES performed better than pupils from a lower SES (527.5;

532.6), while pupils from large towns preformed better than pupils from isolated or rural areas and small towns (524.0; 527.5 and 536.7) respectively.

The same figure shows the mathematics performance of pupils in different categories of competency, according to their gender, socio-economic status and school location. On average, more than half of the pupils (55%) in Mozambique performed within Category 1, with only 1.7% performing at Level 3 and 0% of pupils reaching Level 4. A larger percentage of girls than boys in Mozambique attained only Category 1 (61.5%: 50%), and only 2.4% of boys and 1% of girls performed within Category 3.

Figure 8.25 also reveals that 56.8% of pupils from low SES and 52.5% of pupils from high SES reached Category 1 in Mathematics. 1.5% of pupils from low SES performed within Category 3, while 2% pupils from high SES reached Category 3 and 41.6% of pupils from low SES and 45.5% from high SES reached Category 2.

In terms of school location, 60.6% of pupils from isolated/rural areas, 56.7% of pupils from small towns and 48.3% of pupils from large towns reached Category 1. 2.1% of pupils from isolated or rural and 1.5% from large towns reached Category 3; while 1.6% of pupils from small towns performed the level of Category 3. 37.3%, 37.3%, 41.8% and 50.1% of pupils respectively from isolated or rural areas, small towns and large towns reached Category 2.

In terms of gender, the boys performed better than the girls in both subjects. The boys achieved 537 points on average as against the 520 points average achieved by girls in mathematics, and the boys achieved 518 points in reading as against the girls' 514 points. The differences between boys and girls were greater in mathematics (17 points) than in reading (4 points).

Pupils from low SES groups recorded a weaker performance than their counterparts from higher SES groups. For instance, the differences in the mean reading score rose by 12 points, while in mathematics there was a five-point difference in mean score.

In relation to school location, pupils living in large towns had the highest mean performance (537), followed by pupils in small towns (528) and lastly pupils from isolated or rural areas, who had the lowest performance (524). There was a 13-point difference in the mean score in mathematics between pupils living in large towns and isolated/rural areas, and a 31-point difference between these same pupils in reading. The differences observed in the performance of pupils according to SES and school location in terms of reading are perhaps related to the accessibility of books at home and school, as confirmed by cross-international studies. In fact, according to Postlethwaite and Ross (1992), student scores on reading literacy tests correlate with the composite (use of test language at home, home possessions, number of meals per week and number of books at home). The PISA study (2005) confirms the same findings in referring to the positive effects of home possessions and socio-economic status in reading achievement. In terms of school location, similar results were found in a study conducted in 1983 when the MEC introduced the national system of education (SNE). The study (INDE, 1984) revealed an eight percent difference in school achievement between pupils in rural areas and pupils in urban areas.

As previously stated, pupils achieved higher levels in reading than in mathematics. However, it is strange that even pupils from large towns or higher SES had the level of performance presented in Figures 8.9 and 8.25. In mathematics, for example, 52.5% of pupils from higher SES and 48.3% of pupils from large towns performed at Level 3 or under. One would assume that the level of SES, school location, and the gender of pupils would be a positive factor in pupils' achieving Levels 7 and 8. However, this strong performance did not occur and Grade 6 pupils in Mozambique were unable to achieve these levels of performance, a result which was confirmed in a study conducted in lower primary schools in Mozambique (Passos and Otto, 1992). This study tested students in two schools with differing SES (3 de Fevereiro higher SES and Zimpeto low SES), and recorded that 44% of the pupils in both schools could read. However, the differences are evident in relation to pupils who cannot read, with 6% in 3 de Fevereiro and 39% in Zimpeto being unable to do so (Passos and Otto, 1992). This contrast may mean that schools that are poorly resourced and are situated in poorer economic areas find it difficult to develop and encourage reading in their pupils.

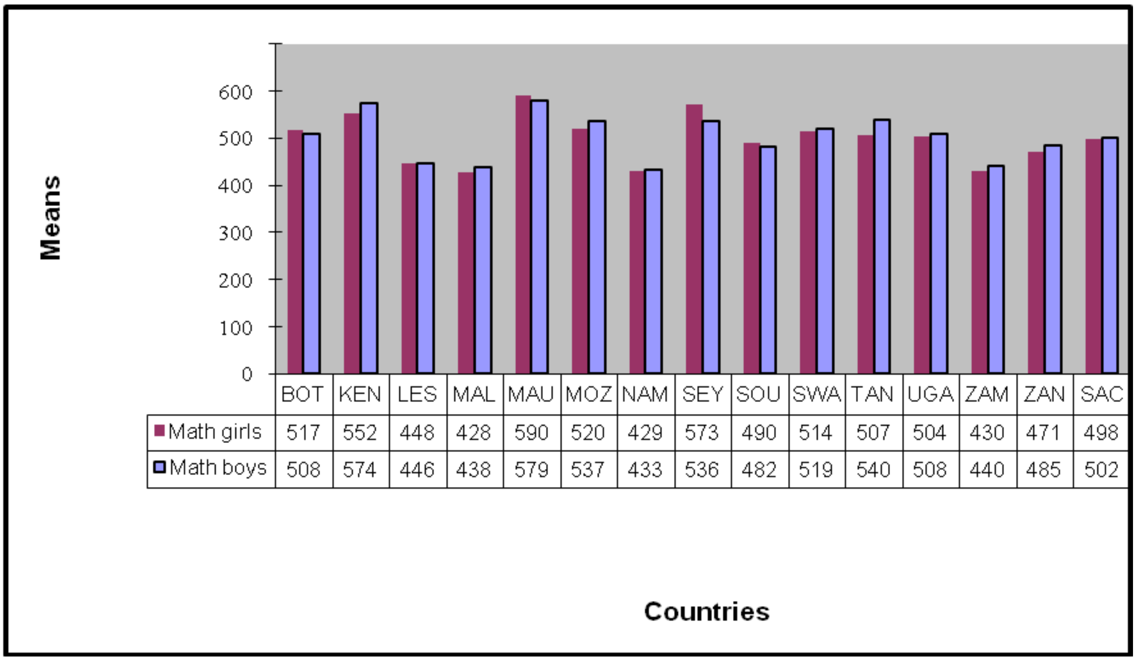
In contrast, other studies have recorded significant differences between the performance of pupils with high and low socio-economic status:

The fact that pupils living in Sommerchield, Polana and Coop have presented better achievement, confirms the existing relationship between achievement and socio-economic level. The parents of pupils that live in these quarters have better socio-economic levels than those living in Malhangalene, Polana Caniço or Urbanização (Passos, 1995, p.79).

Despite the differences observed in Figures 8.9 and 8.25 in terms of means and levels reached by pupils, Mozambique is the SACMEQ country that had the best equity, according to SACMEQ II. This idea of equity means that Mozambique does not have variation within schools and between schools in terms of pupil performance with regard to SES and school location, and this outcome is an issue to ponder over, as the literature stresses that these variables can have an effect on pupil performance.

Pupil performance in mathematics by gender in SACMEQ countries

Figure 8.26 shows pupil performance in mathematics by gender (for more information see Appendix 48).

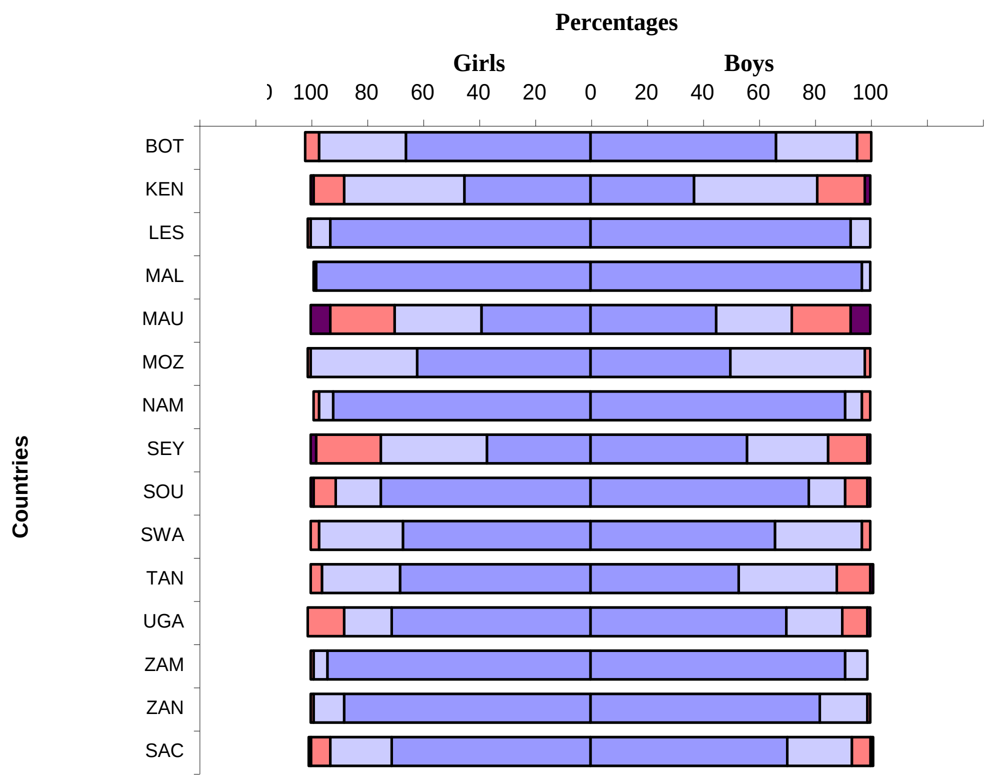


Source: Data from SACMEQ database, 2004

Figure 8.26 Mean scores of mathematics pupils of SACMEQ countries by gender

Figure 8.26 shows that in the SACMEQ countries, on average, boys performed better in mathematics (501.7) than in reading (494.6), while girls in Botswana, Lesotho, Mauritius, Seychelles and South Africa performed better in mathematics than boys. But in Tanzania boys performed better than girls in reading (554.3) and in mathematics (540).

Figure 8.27 presents pupil results by gender in the SACMEQ countries on the combined mathematics competency levels (see Appendix 49).



	SAC	ZAN	ZAM	UGA	TAN	SWA	SOU	SEY	NAM	MOZ	MAU	MAL	LES	KEN	BOT
4 Abstract Problem solving (G)	1	0	0	0	0	0	1	2	0	0	7	0	0	1	0
3 Math skilled/ Prob. Solving (G)	7	1	1	13	4	3	8	23	2	1	23	0	1	11	5
2 Begin./Competent numeracy (G)	22	11	5	17	28	30	16	38	5	38	31	1	7	43	31
1 Pre/Emergent/Basic numeracy (G)	71	88	94	71	68	67	75	37	92	62	39	98	93	45	66
4 Abstract Problem solving (B)	1	0	0	1	1	0	1	1	0	0	7	0	0	2	0
3 Math skilled/ Prob. Solving (B)	7	1	0	9	12	3	8	14	3	2	21	0	0	17	5
2 Begin./Competent numeracy (B)	23	17	8	20	35	31	13	29	6	48	27	3	7	44	29
1 Pre/Emergent/Basic numeracy (B)	70	82	91	70	53	66	78	56	91	50	45	97	93	37	66

Source: Data from SACMEQ database, 2004

Figure 8.27 Percentage of pupils' mathematics categories in SACMEQ countries by gender

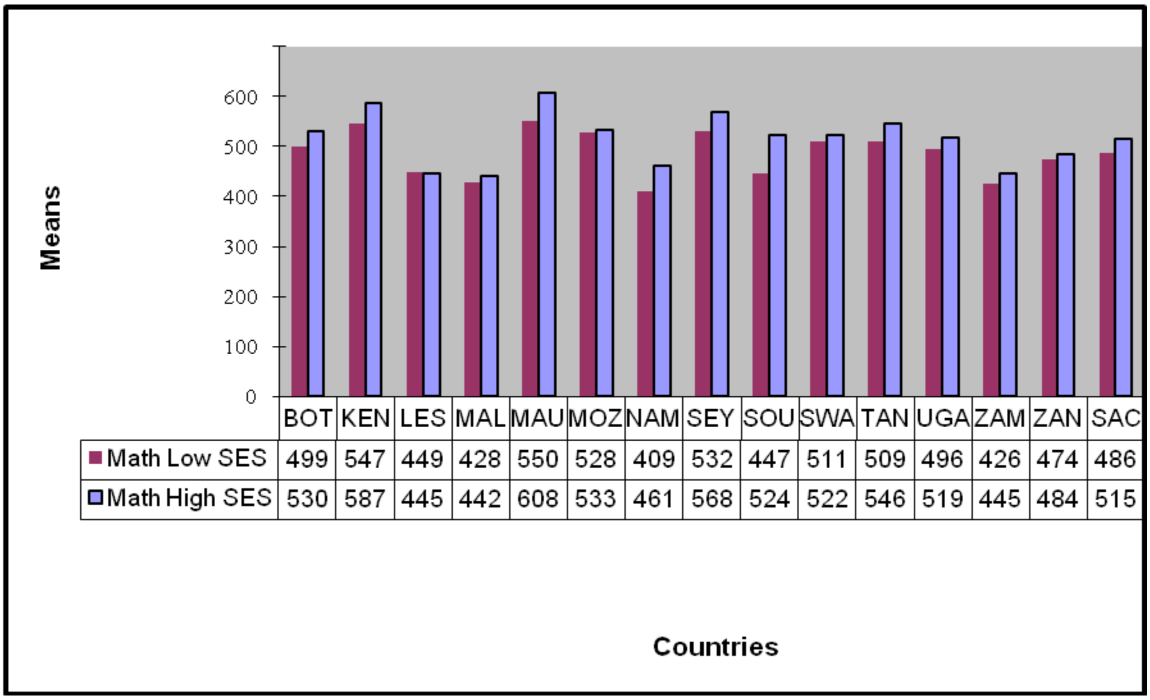
As evidenced in Figure 8.27 above, more pupils have only performed in the lower categories in mathematics than in reading. On average, there is little difference between boys and girls. For instance, on average 69.6% of boys and 71% of girls performed at Category 1 and 22.5% of boys and 21.5% of girls reached Category 2, while 6.7% of boys and 6.7% girls reached Category 3. Finally, only 0.9% of boys and 0.8% of girls performed in Category 4.

Mauritius was the only country with a high percentage of girls and boys alike reaching the upper categories For instance, 22.6% and 6.7% of girls and 20.8% and 7.3% of boys performed at Categories 3 and 4 respectively. Malawi was the country where the most boys (97.1% and 3%) and girls (98.5% and 1.4%) performed in the lowest categories of 1 and 2.

Its can also be observed that among the girls that reached Category 2, the variation ranged from 38% in Seychelles to 1.4% in Malawi, whilst for boys in the same category, the variation ranged from 47.6% in Mozambique to 6% in Namibia. In Category 3, the variation ranged from 23.1% in Seychelles to 0% in Malawi for girls, and for boys the variation ranged from 20.8% in Mauritius to 0% in Malawi. In Mauritius, boys (7.3%) and girls (6.7%) reached the highest category, while no pupils in Mozambique, Malawi, Lesotho and Zanzibar were able to reach Category 4.

Pupil performance in mathematics by socio economic status

Figure 8.28 shows SACMEQ pupil performance in mathematics according to socio-economic status (see Appendix 50).



	BOT	KEN	LES	MAL	MAU	MOZ	NAM	SEY	SOU	SWA	TAN	UGA	ZAM	ZAN	SAC
Math Low SES	499	547	449	428	550	528	409	532	447	511	509	496	426	474	486
Math High SES	530	587	445	442	608	533	461	568	524	522	546	519	445	484	515

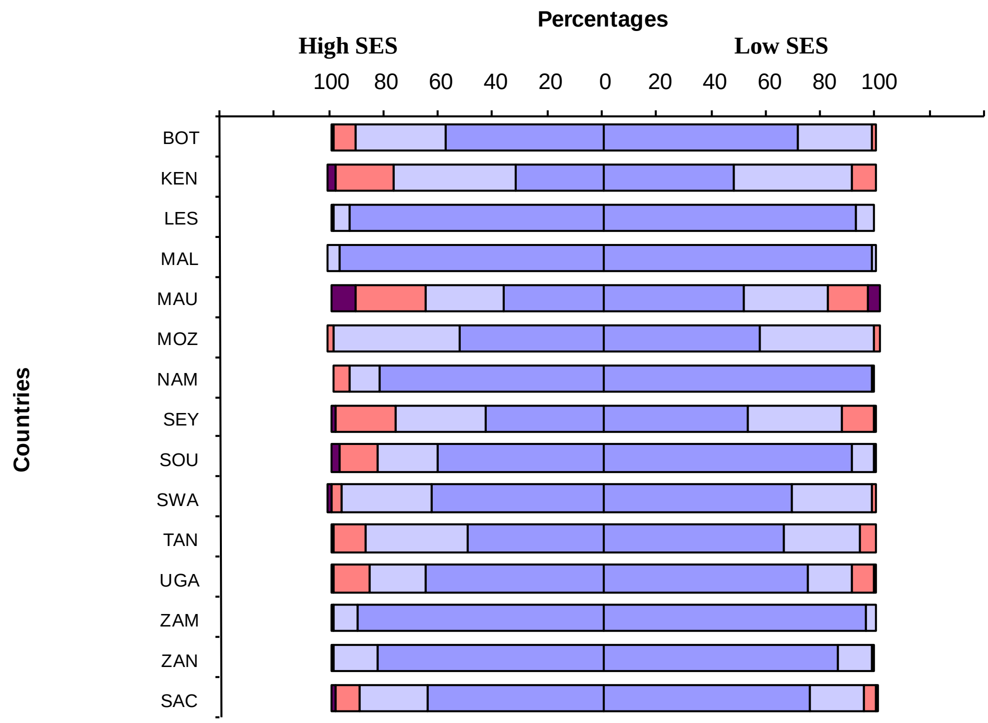
Source: Data from SACMEQ database, 2004

Figure 8.28 Mean scores of mathematics pupils of SACMEQ countries by socio-economic status

Figure 8.28 shows that, on average, pupils from a low SES had 486 points in mathematics, while pupils from a high SES had 515.2 points in mathematics. This figure demonstrates that in the SACMEQ countries, on average, pupils from a low SES scored much lower in mathematics than pupils from a high a SES. The exception is in Lesotho, where interestingly pupils from a low SES performed better in mathematics (448.6) than pupils from a high SES (444.9).

In mathematics, the variation among countries ranged from 425.5 in Zambia to 550 in Mauritius for pupils from low a SES, while from a high SES the variation rose from 442.2 in Malawi to 607.7 in Mauritius.

Figure 8.29 shows pupil performance percentages in mathematics in different levels of competency by socio-economic status across the SACMEQ countries (for more information see Appendix 51).



	SAC	ZAN	ZAM	UGA	TAN	SWA	SOU	SEY	NAM	MOZ	MAU	MAL	LES	KEN	BOT
1 Pre/Emergent/Basic Numeracy (L)	75	86	96	75	66	69	91	53	98	57	51	98	92	48	71
2 Begin./Competent Numeracy (L)	20	12	4	16	28	29	8	34	1	42	31	2	7	43	27
3 Math Skilled/ Prob. Solving (L)	4	1	0	8	6	2	1	12	0	2	15	0	0	9	2
4 Abstract Problem Solving (L)	0	0	0	1	0	0	0	1	0	0	4	0	0	0	0
1 Pre/Emergent/Basic Numeracy (H)	65	83	90	65	50	63	61	43	82	53	37	97	93	32	58
2 Begin./Competent Numeracy (H)	25	16	9	21	37	33	22	33	11	46	28	4	6	45	33
3 Math Skilled/ Prob. Solving (H)	9	1	1	13	12	4	14	22	6	2	26	0	1	21	8
4 Abstract Problem Solving (H)	2	0	0	1	1	1	3	2	0	0	9	0	0	3	1

Source: Data from SACMEQ database, 2004

Figure 8.29 Percentage of pupils' mathematics categories in SACMEQ countries by socio-economic status

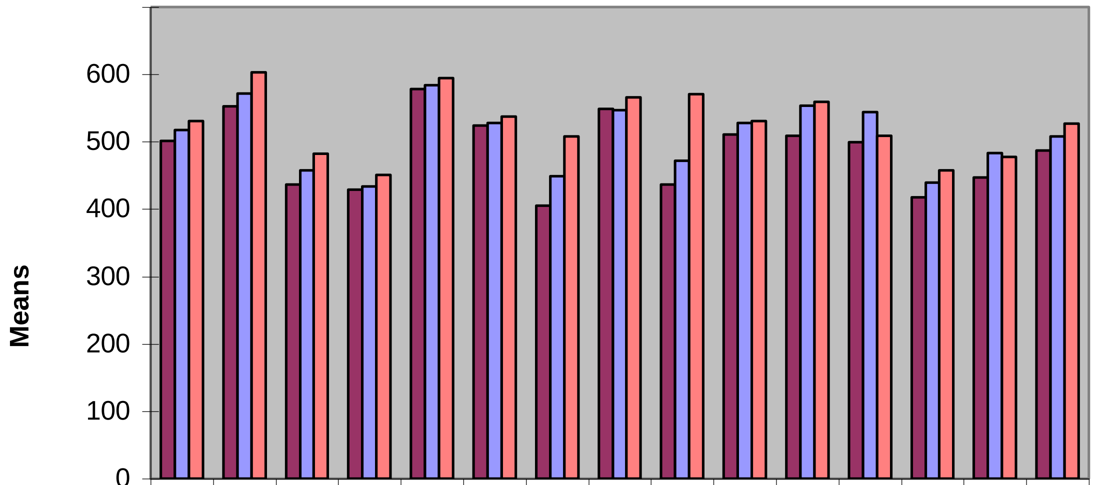
Figure 8.29 above shows pupil performance at different categories of competence. As for reading, pupils from a higher SES in all SACMEQ countries have reached higher categories in mathematics than pupils from a lower SES. 64.7% of pupils from a higher SES and 75.1% from a lower SES respectively performed at Category 1, and 24.5% of pupils from a higher SES and 20.2% from a lower SES respectively reached Category 2. A further 9.3% of pupils from a higher SES and 4.2% from a lower SES reached Category 3. Finally, 1.3% of pupils from a higher SES and 0.4% from a lower SES reached Level 4.

In Mauritius 9.4% of pupils from a higher SES and 3.6% from a lower SES reached Category 4 while in Botswana Namibia, South Africa, Swaziland and Zambia pupil from lower SES did not reached Category 4. Lesotho, Malawi, Mozambique and Zanzibar were the countries where pupils from higher and lower SES that did not reached the highest category.

Among pupils from a higher SES that reached Category 1, the variation ranged from 96.5% in Malawi to 31.7% in Kenya, and among pupils from a lower SES, the variation ranged from 98.4 in Namibia and Malawi to 51% in Mauritius. Among pupils from a higher SES that reached Category 2, the variation ranged from 45.5% in Mozambique to 3.6% in Malawi, while for pupils from a lower SES in the same category the variation ranged from 42.6% in Kenya to 1.4% in Namibia. In Category 3, the variation ranged from 26.2% in Kenya to 0% percent in Malawi for pupils from a higher SES, and for pupils from a lower SES the variation ranged from 14.8% in Mauritius to 0% in Malawi, Mozambique and Zambia.

Pupil performance in mathematics by school location

Figure 8.30 shows the mean performance of pupil mathematics according to school location (see Appendix 52).



	BOT	KEN	LES	MAL	MAU	MOZ	NAM	SEY	SOU	SWA	TAN	UGA	ZAM	ZAN	SAC
Math Isolated/rural	501	553	437	429	578	524	405	549	437	511	509	499	418	447	487
Math Small town	517	572	457	434	584	528	449	547	472	528	554	544	439	483	508
Math Large town	531	603	482	451	594	537	508	566	571	531	559	509	457	477	527

Countries

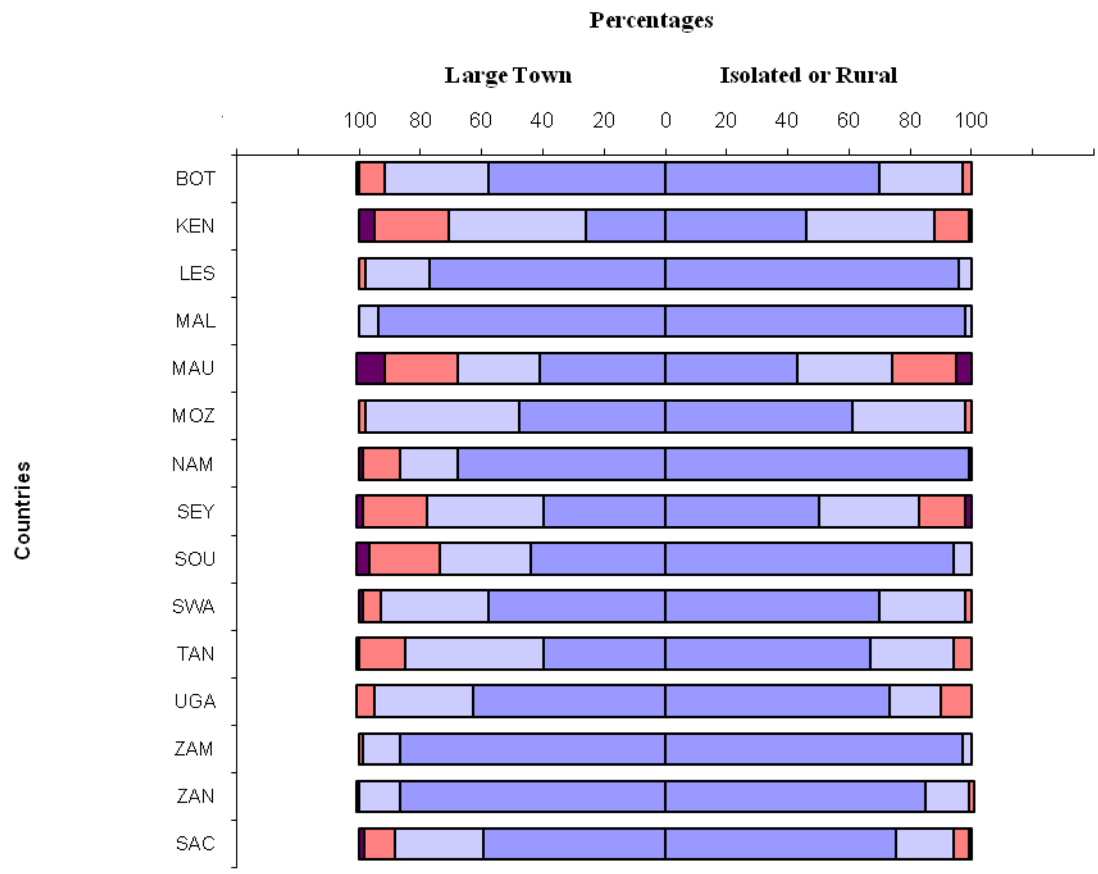
Source: Data from SACMEQ database, 2004

Figure 8.30 Mean scores of mathematics pupils in SACMEQ countries by school location

From the analysis in Figure 8.30 above, it can be observed that pupils from isolated/rural areas had a 487.4 mean in mathematics, their peers from small towns had a mean of 507.7, and those from large towns had a mean of 526.7. On average, pupils from isolated/rural and small towns in the SACMEQ countries had much lower mean performances in mathematics than pupils from large towns. This pattern was apparent in all countries apart from Zanzibar, where pupils from small towns performed better in mathematics than pupils from large towns.

In the isolated/rural areas, the variation in average performance for mathematics among countries ranges from 418.3 in Zambia to 577.6 in Mauritius, in small towns the variation ranges from 434.0 in Malawi to 584.2 in Mauritius, while for pupils from large towns the variation ranges from 451.2 in Malawi to 593.5 in Mauritius.

Figure 8.31 shows the percentage of mathematics results by SACMEQ countries and school location (see Appendix 53).



	SAC	ZAN	ZAM	UGA	TAN	SWA	SOU	SEY	NAM	MOZ	MAU	MAL	LES	KEN	BOT
1 Pre/Emergent/Basic Numeracy	75	85	97	73	67	70	94	50	99	61	43	98	96	46	70
2 Begin./Competent numeracy	19	14	3	17	27	28	6	33	1	37	31	2	4	42	27
3 Math Skilled/ Prob. Solving	5	2	0	10	6	2	0	15	0	2	21	0	0	11	3
4 Abstract Problem Solving	1	0	0	0	0	0	0	2	0	0	5	0	0	1	0
1 Pre/Emergent/Basic Numeracy	59	87	87	63	40	58	44	40	68	48	41	94	77	26	58
2 Begin./Competent Numeracy	29	13	12	32	45	35	30	38	19	50	27	6	21	45	34
3 Math Skilled/ Prob. Solving	10	1	1	6	15	6	23	21	12	2	24	0	2	24	8
4 Abstract Problem Solving	2	0	0	0	1	1	4	2	1	0	9	0	0	5	1

Source: Data from SACMEQ database, 2004

Figure 8.31 Percentage of pupils' mathematics categories in SACMEQ countries by school location

Figure 8.31 above presents the different categories of competence in mathematics according to school location. In all SACMEQ countries, pupils living in large towns achieved higher categories of performance than pupils living in isolated or rural areas. In terms of means reached by pupils in the two areas, it can be observed in the figure above, that on average 59.3% of pupils from large towns and 74.8% from isolated or rural areas respectively performed at Category 1 level, and 28.3% and 19.3% of pupils from large towns and from isolated or rural areas respectively reached Category 2, while 10% and 5.1% of pupils from large towns and from isolated or rural areas respectively reached Category 3. Finally, 1.6% of pupils from large towns and 0.6% from isolated or rural areas reached Category 4.

Among pupils from large towns, Mauritius was the country where 9.1% of the pupils reached Category 4. No pupils from Lesotho, Malawi, Mozambique, Uganda and Zanzibar reached the same level. Mauritius had the highest percentage (5%) of pupils from isolated or rural areas reaching Category 4, followed by Seychelles (2.4%) and Kenya (0.8%). The rest of the countries' pupils had less than 1% reaching this category.

For pupils from large towns that reached Category 1, the variation ranged from 94% in Malawi to 26.3% in Kenya, and among pupils from isolated or rural areas, the variation ranged from 99.1% in Namibia to 43.2% in Mauritius. Among pupils from large towns that reached Category 2, the variation ranged from 50.1% in Mozambique to 6% in Malawi, while for pupils from isolated or rural areas in the same category the variation ranged from 42.1% in Kenya to 0.8% in Namibia. In Category 3, the variation ranged from 23.6% in Mauritius to 0% in Malawi for pupils from large towns, and for pupils from isolated or rural areas, the variation ranged from 20.5% in Mauritius to 0% in Lesotho, Malawi, Namibia and Zambia.

Comparing the results reached by pupils in the three sub groups, namely gender, SES and school location, it can be seen that only a minute difference is recorded in terms of gender, but in some countries the differences in terms of SES and school location are far more substantial, as for instance in the cases of South Africa and Namibia. Apart from factors related to their developing country status, the results of the differences observed in these two countries may be related to the consequences of their Apartheid histories.

The results of the SACMEQ study confirm what is stressed by Kulpoo (1998), that in many less developed countries education in rural areas is often synonymous with a poor context for learning. In the latter half of the 1990s, primary school students in rural areas of sub-Saharan Africa consistently underperformed their urban counterparts by substantial margins. These disparities related to the school location are referred to by Foster (1977, as cited in Zhang, 2006) as one of the factors that contribute towards weak pupil performance. Educational inequality arises more from regional disparity than it does from individuals' characteristics, such as social class and social ethicity. According to Heyneman and Loxley (1983, as cited in Zhang, 2006), schools tend to play greater roles in determining pupils' learning achievement in poor countries than in wealthy countries. The explanation given is that schools in poor countries vary more widely than those in wealthier countries in terms of their quality, in their use of trained teachers, and in materials. In poor countries, therefore, the school a child attends makes a greater difference in how much pupils learn than it would in a more wealthy country.

Heyneman and Loxley's conclusions (1983, as cited in Zhang, 2006) confirm the findings in this chapter and Zhang's (2006) analysis of the SACMEQ II data. Taking into consideration the differences in school conditions, the study relates the regional disparities to the fact that pupils living in isolated or rural areas usually have low SES (Zhang, 2006):

> *Children from rural areas of less developed countries often suffer a socio-economic disadvantage. This certainly seems to be the case for countries participating in the SACMEQ study. On average students attending rural schools came from families with lower levels of SES in every system. Families of sixth graders in Mauritius and Seychelles were, on average, much better off than those in other countries, especially Malawi, Mozambique, Uganda, and both the Tanzanian mainland and Zanzibar. While students' families in Mauritius and Seychelles were better off, the gaps between the well-off and not so well-off were much smaller in these countries than the case in Botswana, Namibia, and South Africa, as can be seen by the standard deviation in each country* (Zhang, 2006, p.584).

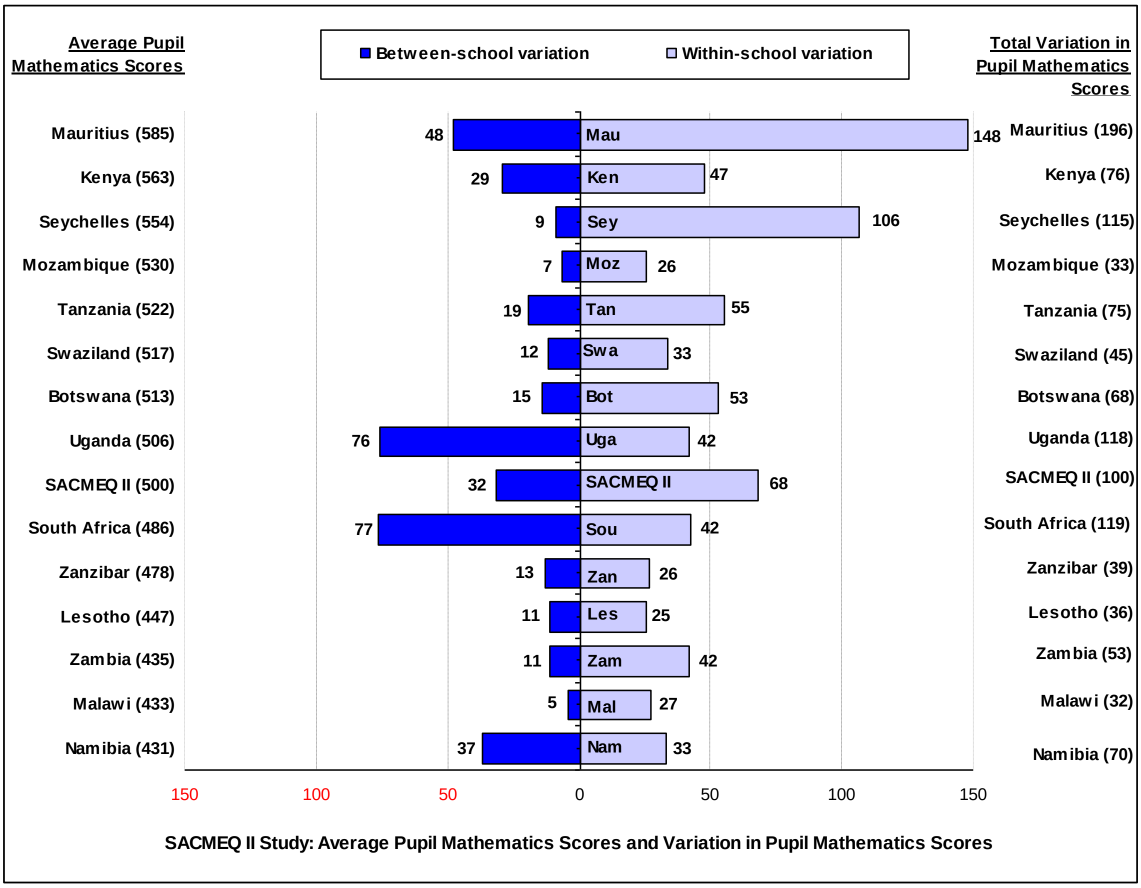
The same author stresses the relations in the SACMEQ study between rural students and SES:

> *Rural students not only lagged behind their counteparts in reading ability but also compared unfavorably in the school conditions that are important to academic success in general. The SES levels of the families of rural students were lower, and the rural students tended to have less home support for their academic work. In addition, rural students tended to be older than their urban counterparts, as a result of late entry into the school system, a higher incidence of grade repetition, or a combination of both. Even though many schools in the SACMEQ countries might benefit from a boost in physical and human resources, this was especially true in rural areas, where more school buildings needed major repairs, where teachers had fewer instructional resources, where schools had fewer facilities, and where teachers had lower reading scores* (Zhang, 2006, p.96).

Despite significant efforts from the various Ministries of Education who took into consideration the SACMEQ II results, it seems that in some countries many children do not have access to proper school facilities. This issue needs to be addressed and a concerted effort made to implement integrated programmes designed to improve teachers' and pupils' performance.

8.2.4 Variation in Mathematics Performance in the SACMEQ Countries between Schools and within Schools

Figure 8.32 presents the between-school and within-school variation in mathematics performance in SACMEQ countries.



Source: Dolata, 2003

Figure 8.32 The average of pupils' mathematics scores and variation in pupils' mathematics scores in SACMEQ countries

In SACMEQ countries as a whole, the total variation was 100 (68 within school and 32 between schools). In mathematics, the total variation ranges from 32 in Malawi to 196 in Mauritius. South Africa (119), Seychelles (115) and Mauritius (196) are the countries that present a total variation higher than the SACMEQ variation (100). In the variation within schools, it can be observed that Mauritius (148) is the country that presents the largest variation, followed by Seychelles (106), while Lesotho (25) shows the least variation. Malawi (27), Mozambique (26) and Zanzibar (26) are the countries that present the smallest variation within schools.

Figure 8.32 also shows the variation between schools, and it can be observed that South Africa (77) is the country that had the largest variation between schools, followed by Uganda (76) and Mauritius (48), while Malawi (5) had the smallest variation, followed by Mozambique (7) and Seychelles (9). South Africa (77), Uganda (76), Mauritius (48) Namibia (37) were the school systems in which the variation between schools was higher than in SACMEQ as a whole, where the variation within schools was 63. Between schools, the variation was 37. This is a pertinent issue to consider as in many countries there are discrepancies between 'good' schools and 'no-so-good schools' and an example of this is seen in South Africa. However, there are also variations seen within schools and this needs to be taken into account as it influences the teaching and learning within that school.

8.3 SUMMARY

The aim of this chapter was to report on the teacher and pupil performance in the SACMEQ reading and mathematics tests in Grade 6 in upper primary schools in Mozambique and other SACMEQ countries. The performance results were analysed by examining at provincial, national and regional levels as linked to gender, socio-economic status and school location. This information represents the basis for subsequent analysis in Chapter 9.

Teachers and pupils in all SACMEQ countries with the exception of South Africa and Mauritius submitted to the testing of their reading and mathematics test knowledge in order that the cognitive outcomes in the SACMEQ study could be measured.

On average, mathematics teachers in Mozambique achieved a mean of 782.8 points and reading teachers achieved 716.2, with a difference of about 66.6 points, whereas in all SACMEQ countries as a whole, mathematics teachers achieved 792 points and reading teachers achieved 734, with a difference of about 58 score points.

Mozambican pupils on average also performed better in mathematics (530) than in reading (516.7) in terms of their mean scores, with a difference of about 13.3 points.

When comparing the results it can be observed that, on average, teachers in Mozambique performed higher in both subjects, namely reading (716.2) and mathematics (782.8), than their pupils, who scored 516.7 in reading and 530 in mathematics, with a difference of about 199 score points in reading and 253 in mathematics. In the SACMEQ countries on as a whole, teachers performed higher in both subjects, scoring 733.8 in reading and 791.7 mathematics, than their pupils by a difference of about 234 score points in reading and 292 in mathematics.

In terms of the levels of competency reached by teachers and pupils, the findings show that in Mozambique the lowest percentages of pupils and teachers' performance can be observed at Levels 1, 2, 7 and 8 and the highest percentages at Levels 4 and 5. The percentages begin to increase at Level 3 and decline at Level 6 in reading. In mathematics, the percentages begin to increase at Level 2 and decline at Level 5. In the case of teachers, the finding shows that the lowest percentages can be observed at Levels 1, 2, 3, 4 and 5 and the highest percentages at Levels 7 (problem solving) and 8 (abstract problem solving).

In the case of teachers, the percentage begins to increase at Level 5, and in case of mathematics, it decreases at Level 8. It is important to note that the situation in Inhambane province is quite worrying, with 20% of teachers achieving Levels 4 and 5 in reading and 2.7% of mathematics teachers reaching only Level 3, which is very low for teachers.

In the SACMEQ countries as a whole, the percentage begins to increase at Level 2 and decline at Level 6 (inferential reading) in the case of pupils. For reading teachers, the lowest percentage can be observed at Levels 1, 2, 3, 4 and 5 and the highest at Levels 7 and 8.

In SACMEQ countries as a whole, pupils' percentages in mathematics begin to increase at Level 2 and decline at Level 5. The majority of pupils reached Level 3 and 4. For teachers the lower percentage is observed at Levels 1, 2, 3, 4 and 5 and the highest at Levels 7 and 8.

Some 22% of the pupils in SACMEQ countries performed at Levels 1 (pre-reading) and 2 (emergent reading). This result means that those pupils cannot read at all, and could be considered illiterate. Special attention from key stakeholders, including the respective Ministries of Education, is necessary in countries like Zambia (47.7% in reading and 71.2% in mathematics), Malawi (45.5% in reading and 74.3% in mathematics), Namibia (43.4% in reading and 76.6% in mathematics), South Africa (31% in reading and 52.2% in mathematics) and Lesotho (24.4% in reading and 65.9% in mathematics), where pupils performed at Levels 1 and 2 in reading and mathematics, which is extremely low for Grade 6. The higher percentage of pupils in the two levels has far-reaching implications in terms of the internal and external efficiency of these education systems. The quality is low, and pupils who perform at this level cannot proceed to higher levels of schooling. In Mozambique, pupils are meant to learn to read and write in Grades 1 and 2.

Mozambican boys (537 and 518.4) performed better than the girls (519.5 and 514.1) in both subjects. In the SACMEQ countries as a whole, girls performed better in reading (505.1) than boys (494.6), while in mathematics boys (501.7) performed better than girls (498.1).

As the results show, in Mozambique as in the SACMEQ countries as a whole, pupils from higher SES and large towns performed better in reading and mathematics than pupils from lower SES and isolated/rural areas. Using SACMEQ data, Zhang's (2006) analysis found that rural pupils in some SACMEQ coutries not only lagged behind their counteparts in reading ability, but also that the conditions of rural schools compared unfavourably with the condidion of urban schools. School conditions are important to academic success in general. Pupils from rural areas belong to lower SES families and they tended to have less home support for their academic work. In addition, rural students tended to be older than their urban counterparts, as a result of their late entry into the school system, a higher incidence of grade repetition, or a combination of both. In addition to their poor condition, schools in rural areas had fewer instructional resources and fewer facilities. Teachers at these schools recorded lower reading scores.

Judging from the results of the SACMEQ study, it seems that many chilren in some countries do not have access to proper school facilities, despite significant efforts from the Ministries of Education in those countries, which may show that there is a relationship between the condition of rural schools and weak teacher and pupil performance. Integrated programmes should be established, aimed at the simultaneous improvement of the condidion of schools, and teacher and pupil performance.

It can be observed from the variation within and between schools that besides the school location, school resources and grade repetition (78.2%), Mozambique was one of the school systems that presented more equity, meaning that there was no high level of disparity in terms of the school system and pupil performance in school and between schools. To be specific, the total variation in Mozambique was 42, (12 between school and 29 within school), a fair reflection on the role that the Ministry plays in seeking equity for all its pupils. A similar pattern can be seen in Malawi (7 and 18), Zanzibar (12 and 37), Lesotho (13 and 21) and Swaziland (17 and 29).

In contrast, countries such as Mauritius and Seychelles present the highest variation within school of 110 and 142 respectively, while South Africa was the country that showed the highest variation between schools, of 104. Reasons for the difference in those three countries in terms of pupil performance within school (Mauritius and Seychelles) and between schools (South Africa) should be identified and ultimately addressed.

In the era of education for all one of the challenges for all education systems is to improve the quality of the education system and provide equitable education across the board. According to Sedel (2003, p.43) “the challenge of basic education policy is not only a challenge of quality but also one of equality: of equal opportunities to learn and achieve.” As stated by Dolata, Ikeda and Murimba (2004), the above results have implications for education in SACMEQ countries in terms of access: “Seychelles, Uganda, and Malawi have excellent participation rates for the first six years of schooling – with Net Enrolment Ratios that approach or exceed 95 percent. But Mozambique is much lower – with a Net Enrolment Ratio in the region of 70 percent” (2004, p.8). Quality and equity while are good in Malawi, but South Africa and Uganda need to improve equity by reducing the between-school variation in pupil reading and mathematics scores.

Chapter 9 highlights the main factors, which explain the pupil performance variation in Mozambique and other SACMEQ countries, and their relationship to teacher competence. The Multivariate Regression Model (MRM) is used to analyse to what extent the pupil performance variation is explained by various domains described in the conceptual framework.

CHAPTER 9

PREDICTORS OF MOZAMBICAN AND SACMEQ PUPIL PERFORMANCE IN READING AND MATHEMATICS IN RELATION TO TEACHER COMPETENCE

INTRODUCTION

The purpose of this chapter is to provide information about the main factors, which explain the pupil performance variation in Mozambique and other SACMEQ countries and their relationship to teacher competence. The Multivariate Regression Model (MRM) was used to analyse to what extent the pupil performance variation is explained by various domains described in the conceptual framework, as described in detail in Chapter 5, Section 5.3. The results are presented, starting with exploratory statistics such as bivariate correlations between pupil performance and each domain and construct of the conceptual framework, as elaborated on in Chapter 5, Section 5.1.

In this section, the overview of the correlation between pupil performance and each domain and construct of the conceptual framework, first in Mozambique and then in SACMEQ countries, is presented and discussed in Section 9.1. Specifically the overview of the correlations between pupil performance in reading and in mathematics in Mozambique and in SACMEQ countries as a whole is presented and discussed in Section 9.1.1. The overview of the relationship between pupil performance in reading and mathematics and each domain and construct of the conceptual framework in Mozambique and in SACMEQ countries are presented and discussed in Section 9.1.2, while Section 9.1.3 of this chapter presents and discusses the correlations between pupil performance in reading and mathematics and the domain and constructs of the conceptual framework in Mozambique and in SACMEQ countries. This is followed by multiple regressions in Section 9.2. The overview of the results of multiple regression in reading and in mathematics in Mozambique and in SACMEQ countries as a whole is presented and discussed in Section 9.2 1. Predicting pupil performance in reading by teacher competence factor in Mozambique and in SACMEQ countries as a whole as well as in each SACMEQ country is presented Section 9.2.2, while predicting pupil performance in mathematics by teacher competence factor in Mozambique and in SACMEQ countries as a whole as well as in each SACMEQ country is presented and discussed in Section 9.2.3. Finally, the chapter concludes with a summary in Section 9.3.

The analysis was guided by the conceptual framework (see Chapter 5, Figure 5.1), which is organised into three domains, namely the cognitive, affective and behavioural, on three levels, the provincial, national and regional. The conceptual framework also includes the following constructs: teacher training, teacher characteristics, external teacher context, internal teaching context, pupils' characteristics, and parent and community school involvement. The variables that make up each of the domains and constructs of the conceptual framework can be seen in Appendix 47. These were used as explanatory variables and the pupil performance is regarded as the dependent or response variable. However, some of the domains are composed of several items and principal components analysis (PCA) was used in order to group the items in indicator.

As referred to in Chapter 5, Section 5.2 (see also Appendix 54), variables representing domains such as the cognitive, affective and behavioural, and constructs such as the external teaching context, the internal teaching context, teacher characteristics, pupils' characteristics, and parents and community school involvement, were developed using principal components analysis (PCA). This technique was used to identify common components (or factors) underlying a set of items in the survey data. Using this approach, it was possible to condense the information contained in the original variables into a smaller set (Smith, 2002). A set of indicators was therefore grouped and a score calculated, using PCA, for each one of the above domains and constructs (see Appendices 3 and 4).

Constructs such as the internal teaching context proxy variables from the SACMEQ data were used. For instance, the proxy variable used for pupil characteristics was socio-economic status (parent education. possessions at home, the source of lighting, and the composition of the walls, roof and floor). For the teachers' characteristics, it was the teachers' possessions at home (a daily newspaper, a weekly or month magazine, a radio, a TV set, a video cassette recorder (VCR), a cassette player, a car, a telephone, a refrigerator/freezer, a motorcycle, a bicycle, piped water, electricity, a generator, solar panels, a table to write on – to a maximum of 13 items). For the internal teaching context it was class resources (a writing board, chalk, a cupboard, a chart, bookshelves, a classroom library, a teacher table and a teacher chair, to a maximum of 8 items) and teacher class furniture (a map, English/Portuguese/Swahili Dictionary, a subject teacher guide in English/Portuguese/Swahili, a teacher guide for mathematics, and geometrical instruments, to a maximum of 5 items), while the external teaching context included school resources (a library, a hall, a staff room, a school head's office, a store room, first aid facilities and equipment, a sports ground, water, electricity, a telephone, a fax machine, a garden, a typewriter, a duplicator, a radio, a tape recorder, an overhead projector, a television set, a video-cassette recorder, a photocopier, a computer, a fence, and a cafeteria, to a maximum of 22 items).

In summary, the data analysis was performed in two phases. In the first phase the database were already weighted by SACMEQ and aggregated by school, and then PCA was used to develop proxy variables for the domains in which there are no indices on the database. In the second phase, the analysis started with correlation statistics between pupil performance and their background variables. Finally, in the third stage the regression model was developed using the multivariate regression equation to determine to what extent the empirical evidence supports the conceptual framework. In both phases, findings are presented with the Mozambican results first, followed by comparisons between Mozambique and the other SACMEQ countries.

9.1 EXPLORING RELATIONSHIPS BETWEEN TEACHER COMPETENCE AND PUPIL PERFORMANCE IN MOZAMBIQUE AND IN OTHER SACMEQ COUNTRIES

The next sections will present and discuss an overview of the relationship between teacher competence and pupil performance in Mozambique and in other SACMEQ countries.

9.1.1 An Overview of Mozambique and SACMEQ Countries as a whole

The analysis followed the structure of the conceptual framework, which is composed of three domains and six constructs. The Multivariate Regression Model was used to understand to what extent the pupil performance variation is explained by various domains and constructs described in the conceptual framework. Correlations were analysed as a preliminary step before the regression was undertaken. However, in order to give an overview of the relationship between pupil performance and each of the domains and constructs of the conceptual framework in Mozambique and in other SACMEQ countries, specific criteria were used to group the correlations as having strong, weak or no relationship. Whilst Tables 9.1, 9.2 and 9.3 give a broad overview of the relationships per domain, the details for individual constructs or variables are provided in Section 9.1.2, where the specific criteria for analysing the particular relationships are given, using correlational analysis.

For each of the domains there are a particular number of indicators or variables. A correlation between pupil performance and each one of the indicators was computed:

- ❖ Where half or more than half of the variables in the domains or constructs have a correlation of .15 or better, it was classified as *strong* (S);
- ❖ Where fewer than half of the variables in the domains or constructs a achieve correlation of .15 or better, it was classified as weak (W); and

- ❖ Where no variables in the domains or constructs achieved a correlation of .15 or better, the domain or construct was classified as no correlation (NC).

Bivariate correlation was used to explore to what extent it could be considered in relation to the conceptual framework. Bivariate correlation between pupil performance and the various indicators of each domain were computed for Mozambique and across the SACMEQ countries.

Tables 9.1, 9.2 and 9.3 give the first sense of how strong the correlation of each domain and pupil performance in Mozambique and across SACMEQ countries is in reading and mathematics in different domains and constructs of the conceptual framework at provincial, national and regional level.

Table 9.1

Overview of the findings from the correlations between variables in the domain and constructs of the teacher competence model and pupil performance in reading and mathematics, at national and regional level

	Cognitive		**Affective**		**Behaviour**		**Teacher training**		**Teacher Characteristics**		**Ext. Teaching Context**		**Int. Teaching Context**		**Pre-existing Pupils Char.**		**Parent Involvement**	
	Read	**Math**	**Read**	**Math**	**Read**	**Math**	**Read**	**Math**	**Read**	**Math**	**Read**	**Math**	**Read**	**Math**	**Read**	**Math**	**Read**	**Math**
MOZ	S	W	NC	W	W	W	W	W	S	S	S	W	W	W	S	S	W	W
SAC	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S

Legend: **S** = strong (Number of variables with strength correlation .15 were equal or above .0.5 percent)
W = weak (Number of variables with strength correlation .15 were below .0.5 percent)
NC = no correlation (Strength correlation above 0.5 percent)

Table 9 2

Overview of the findings from the correlations between variables in the domain and constructs of the teacher competence model within Mozambique and pupil performance in reading and mathematics

	Cognitive		**Affective**		**Behaviour**		**Teacher training**		**Teacher Characteristics**		**Ext. Teaching Context**		**Int. Teaching Context**		**Pre-existing Pupils Char.**		**Parent Involvement**		**Total <u>Strong</u>**	
	Read	**Math**	**Read**	**Math**	**Read**	**Math**	**Read**	**Math**	**Read**	**Math**	**Read**	**Math**	**Read**	**Math**	**Read**	**Math**	**Read**	**Math**	**Read**	**Math**
CAB	S	S	S	S	S	S	S	S	W	W	S	S	W	S	S	S	S	S	**7**	**8**
GAZ	S	S	S	S	S	S	W	W	S	S	S	S	S	S	S	S	S	W	**8**	**7**
INH	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	**9**	**9**
MAC	S	S	W	S	W	S	S	S	S	W	S	S	S	S	S	W	S	W	**7**	**6**
MAN	S	W	S	S	S	S	S	S	NC	W	S	W	S	W	S	S	W	S	**7**	**5**
MAP	S	S	S	S	S	S	W	S	S	W	S	S	W	S	S	S	S	W	**7**	**7**
NAM	W	S	S	W	S	S	S	S	S	W	S	W	W	W	S	W	W	W	**6**	**3**
NIA	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	**9**	**9**
SOF	W	S	W	W	S	S	S	W	W	S	S	S	S	S	S	S	S	S	**6**	**7**
TET	W	W	S	S	S	S	S	W	W	S	S	S	S	S	S	S	S	W	**7**	**6**
ZAM	W	W	S	W	S	S	S	W	S	W	S	S	W	W	S	S	S	S	**7**	**4**
TT (S)	**7**	**8**	**9**	**8**	**10**	**11**	**9**	**7**	**7**	**5**	**11**	**9**	**7**	**8**	**11**	**9**	**9**	**6**	**80**	**71**

Legend: **S** = strong (Where half or more than half of the variables in the domains or constructs have a correlation of .15)
W = weak (Where fewer than half of the variables in the domains or constructs have a correlation of .15)
NC = no correlation (Where no variables in the domains or constructs have a correlation of .15)

As stated in Chapter 5, Section 5.4, the main research question in this study is: *"What is the effect of relationship between teacher competence on and pupil performance in upper primary school in Mozambique and in the SACMEQ countries?"*

Table 9.1 presents an overview of the findings from the grouped correlations between pupil performance in reading and mathematics and each domain of teacher competence model at national and regional level. In Table 9.1, it can be observed that teacher training in Mozambique had a weak relationship with pupil performance in reading and in mathematics. Comparing Mozambique with SACMEQ as whole, it can be observed that in the SACMEQ countries, all of the domains had strong correlations with pupil performance, while in Mozambique only *teachers' characteristics* and *pre-existing pupils' characteristics* had a strong correlation with pupil performance in both subjects, while in the *cognitive domain* the *external teaching context* had a strong correlation with pupil performance in reading. There was no correlation between pupil performance in reading and variables that comprise the *affective domain* in Mozambique.

In Table 9.2, it can be observed, across provinces in Mozambique, that more relationships were found between pupil performance in reading (80) than in mathematics (71) and the various variables in domains and constructs of the conceptual framework. Examining each domain and construct, it can be observed that the *behavioural domain* seems to be the one domain where most correlations were found across all provinces (10 in reading and 11 in mathematics), followed by the *external teaching context construct* (11 in reading and nine in mathematics) and *pre-existing pupils' characteristics* (11 in reading and nine in mathematics). This finding shows that the teachers' attitudes as well as the pupils' attitudes had an effect on pupil performance in reading and in mathematics.

Another construct to take into consideration in pupil performance in Mozambique is the *external teaching context*, which includes variables such as schools' location, schools' conditions, schools' resources, and *pre-existing pupils' characteristics* that include variables such as pupils' SES, home condition, and the provision of meals, as these have an effect on pupil performance. *Teacher characteristics* (seven in reading and five in mathematics) and the *cognitive domain* (seven in reading and eight in mathematics) seem to be the constructs and domain where fewer correlations were found across all provinces. Inhambane and Niassa are the provinces in Mozambique where most correlations were found (in all domains and constructs in reading and in mathematics), followed by Cabo Delgado (seven in reading and eight in mathematics) and Gaza (eight in reading and seven in mathematics). Nampula is the province that presents a weak relationship (six in reading and three in mathematics) between pupil performance and variables in each domain within the construct of the conceptual framework. Appendix 55 shows the overview of the correlations in

Mozambique and the weak relationship between pupil performance in reading and in mathematics and the variables at different domains and constructs.

Table 9.3 presents the correlations between pupil performance in reading and mathematics and background variables or factors within different domains of the conceptual framework across SACMEQ countries. Drawing on this table, it can be seen that in SACMEQ countries there were more relationships between single variables in the domains and constructs and pupil performance in reading (52) than in mathematics (34). The data seems to be consistent with the conceptual framework in SACMEQ countries as a whole. Most variables in the domains and constructs had weak relationships with pupil performance except within the affective domain, which showed evidence of a stronger relationship in mathematics. Examining each domain and construct across the countries, it seems that the variables in *affective and behavioural domains* had the weakest correlation with pupil performance in reading and in mathematics. The strongest construct is *pre-existing pupils' characteristics* in both subjects (12 in reading and 11 in mathematics out of 14 systems of education), followed by the *external teaching context*, with eight in each subject out of 14 systems of education.

However, in Table 9.3 it can also be seen that country by country the picture changes. In countries such as Lesotho, Malawi and Zanzibar, it seems that the data are not consistent with the conceptual framework, with only one or two out of nine domains and constructs having strong relationships with pupil performance. In other countries, such as South Africa (six in reading and five in mathematic out of the nine) and Namibia (seven in reading and four in mathematic out of the nine), it seems that the data are consistent with the conceptual framework.

Table 9.3

Overview of the findings from the correlations between variables in domain and construct and pupil performance in reading and mathematics in SACMEQ countries

	Cognitive		**Affective**		**Behaviour**		**Teacher training**		**Teacher Characteristics**		**Ext. Teaching Context**		**Int. Teaching Context**		**Pre-existing Pupils Char.**		**Parent Involvement**		**Total Strong**	
	Read	**Math**	**Read**	**Math**	**Read**	**Math**	**Read**	**Math**	**Read**	**Math**	**Read**	**Math**	**Read**	**Math**	**Read**	**Math**	**Read**	**Math**	**Read**	**Math**
BOT	S	S	W	W	W	W	W	S	S	S	W	W	W	W	S	S	S	S	**4**	**5**
KEN	W	W	NC	W	W	W	W	W	S	W	S	S	S	S	S	S	S	S	**5**	**4**
LES	W	W	NC	NC	W	W	W	W	W	W	W	W	W	W	W	W	W	NC	**-**	**-**
MAL	W	W	W	W	W	W	W	W	W	W	S	S	W	W	W	W	W	W	**1**	**1**
MAU	W	W	W	W	W	W	W	W	NC	W	S	S	W	W	S	S	W	S	**2**	**3**
MOZ	S	W	NC	W	W	W	W	W	S	S	S	W	W	W	S	S	W	W	**4**	**2**
NAM	S	S	W	W	W	W	S	S	S	W	S	S	S	W	S	S	S	W	**7**	**4**
SEY	S	W	W	S	S	S	W	W	S	W	W	W	S	W	S	S	S	W	**6**	**3**
SOU	S	S	W	W	W	W	S	S	S	W	W	S	S	S	S	S	S	W	**6**	**5**
SWA	W	W	W	NC	W	W	W	W	S	W	S	S	W	W	S	S	W	W	**3**	**2**
TAN	W	W	NC	NC	W	W	W	W	S	W	S	S	S	W	S	S	W	W	**4**	**2**
UGA	W	NC	NC	W	W	W	W	W	S	W	W	W	W	W	S	S	W	W	**2**	**1**
ZAM	S	W	NC	NC	W	W	W	W	S	W	S	S	S	W	S	S	S	W	**6**	**2**
ZAN	W	W	W	W	W	W	W	W	S	W	W	W	W	W	S	W	W	W	**2**	**-**
TT(S)	**6**	**3**	**-**	**1**	**1**	**1**	**2**	**3**	**11**	**2**	**8**	**8**	**6**	**2**	**12**	**11**	**6**	**3**	**52**	**34**

Legend: **S** = strong (Where half or more than half of the variables in the domains or constructs have a correlation of .15 or greater)
W = weak (Where fewer than half of the variables in the domains or constructs have a correlation of .15 or greater)
NC = No correlation (Where no variables in the domains or constructs have a correlation of .15)

9.1.2 An Overview of the Correlations between Pupil Performance in Reading and Mathematics in Mozambique and in other SACMEQ Countries

This section presents an overview of the correlations between pupil performance in reading and mathematics and the domain and constructs of the teacher competence model within Mozambique and in SACMEQ countries, and it also summarises the correlations at provincial, national and regional level.

Cohen and Manion's framework (in Creswell, 2002, p.372) was used for interpreting the strength of association between two variables, given the following size of coefficients:

.20-35: When the correlations range from .20 to 35, there is only a slight relationship. This relationship may be slightly statistically significant for 100 or more participants. The size of a coefficient may be valuable to explore the interconnection of the variables, but of little value in prediction studies.
.35-65: When the correlations are above .35, they are useful for limited prediction. They are the typical values used to identify variable membership in statistical procedure of factor analysis (the inter-correlation of variables with a scale), and many correlation coefficients for bivariate relationships fall into this area.
.66-85: When the correlations fall into this range, good prediction can result from one variable to the other. Coefficients in this range would be considered very good.
.86 and above: Correlations in this range are typically achieved for the studies of construct validity or test-retest reliability.

As this is regarded as an exploratory study, all relationships above .15 (see Howie, 2002) are included, but only those above .20 (see above) are discussed in this section. Appendices 55 and 56 present the overview of the correlations between pupil performance and all of the variables at different domains of the conceptual framework in Mozambique and SACMEQ countries respectively.

Cognitive, affective and behavioural domains in Mozambique

Table 9.4 presents the correlations between variables in the cognitive, affective and behavioural domains and pupil performance in reading and in mathematics. As can be observed, there was a slight but noticeable relationship between pupil performance in reading and in mathematics and the three domains. However, pupil performance in reading was a good predictor of pupil performance in mathematics ($r = .778$) in the **cognitive domain**, while in the **behavioural domain** there was an association between pupil performance in reading and speaking Portuguese at home ($r = .428$), which is useful for a limited prediction. Examining teacher performance in the reading test *(ratott)* in the **cognitive domain**, it can be seen that having a teacher with *secondary* and *tertiary education* and a s*chool head with an academic qualification* had a slight correlation with pupil performance in reading. In the **affective domain**, only *teacher satisfaction-school building quality* had a relationship with pupil performance in mathematics. In the **behavioural domain**, more variables were related to pupil performance than other domains. However, only eight out of the 23 variables had a relationship with pupil performance in reading and in mathematics. The variables in the behavioural domain that had a relationship were more related to teachers' attitudes than to a teachers' approach in the classroom.

Table 9.4

Correlations between variables in cognitive, affective and behavioural domains and pupil performance in reading and in mathematics in Mozambique

Domains	Variables	Pupils' reading test			Pupils' math test		
		Pearson C.	Sig.	n	Pearson C.	Sig.	N
Cognitive	Pupil maths-all total raw score	.778	.000	176	-	-	-
	Teacher reading-all total raw score *	.201	.008	172	-	-	-
	Teachers with secondary education	.168	.029	168	-	-	-
	Ratio/T having tertiary academic education	-.171	.027	168	-.229	.003	168
	School head qualification-academic	.175	.023	168	-	-	-
Affective	Math teacher satisfact.-school building quality	-	-	-	-.218	.004	171
Behavioural	R/M T. reporting comments in reading/math	-.153	.045	173	-.158	.039	171
	Pupils absent – work	-.326	.000	175	-.292	.000	175
	Pupils speaking Portuguese at home	.428	.000	176	-	-	-
	S. head activities importance-contact with local com.	.219	.004	168	.225	.001	168
	Reading T. reporting comments on Portuguese	-.153	.045	173			
	School head years of teaching	.154	.046	168	.153	.048	168
	Math teacher frequency meeting parents	-	-	-	.197	.010	171
	Math T. frequency giving written math test	-	-	-	-.160	.037	171

Pupils speaking Portuguese at home was the strongest variable in reading, while in mathematics the strongest variable was pupils' absent-work. (For more information see Appendix 55 see also Chapter 6 Tables 6.2; 6.6 and 6.7).

Cognitive, affective and behavioural domains in SACMEQ countries

Table 9.5 illustrates that the variables in all three domains had a positive correlation with pupil performance in reading and in mathematics, except for *pupils' days absent*, *pupils' absent to work*, and *school head experience in this school*. *Teachers with primary education only, teachers' satisfaction-teacher house availability* and *teachers' satisfaction-teacher house quality* had a negative relationship with pupil performance in mathematics.

Table 9.5

Correlations between variables in cognitive, affective and behavioural domains and pupil performance in reading and in mathematics in SACMEQ countries

Domains	Variables	Pupils reading test			Pupils math test		
		Pearson C.	Sig.	N	Pearson C.	Sig.	N
Cognitive	Pupil math-all total raw score	.874	.000	2294	-	-	-
	Teacher reading/ math-all total raw score	.232	.000	1928	.421	.000	1869
	Teachers qualification-academic	.155	.000	2255	.217	.000	2218
	Reading/mathematics goals	.175	.000	2255	.092	.000	2142
	Teachers with tertiary education	.167	.000	2279	.101	.000	2279
	School head qualification	.191	.000	2279	.179	.000	2279
Affective	Reading/math t. sat.- teacher house availability	-	-	-	-.164	.000	2218
Behavioural	Teachers' read/math approach (factor)	.171	.000	2255	-	-	-
	Pupils speaking language of instruction at home	.351	.000	2294	.274	.000	2294
	School head experience in this school	-.167	.000	2279	-.217	.000	2279
	Teachers pupils' parents meet year	.252	.000	2255	-	-	-
	Pupils' days absent	-.196	.000	2294	-	-	-
	Pupils' absent - work	-.264	.000	2236	-	-	-
	Pupils' absent – fee not paid	-	-	-	-.251	.000	2236

In the **cognitive domain** there was a strong or high correlation (r = .874; p = .000) between *pupil performance in reading* and *pupil performance in mathematics*. The **affective domain** presents the weakest correlation among the three domains. Only *teacher satisfaction regarding housing availability* had a very slight relationship with *pupil performance in mathematics*. *Pupils speaking the language of instruction at home* had a stronger relationship with *pupil performance in reading* (r = .351) than *in mathematics* (r = .274) and was the strongest variable in the **behavioural domain**. It can be observed that *pupils speaking the language of instruction at home* tended to do better in reading and slightly better in mathematics than those who did not. However, school head experience had a negative relationship with pupil performance in mathematics particularly. The importance of the teacher's meeting the pupils' parents was evident in reading, as there was a positive relationship with pupil achievement.

Table 9.6 below shows the correlation between pupil performance in reading and in mathematics as responses and *teacher training* and *teachers' characteristics* as exploratory variables. (For more information see Appendix 56, see also Chapter 6 Tables 6.5; 6.8 and 6.9).

Table 9.6

Correlations between variables for teacher training and teachers' characteristics and pupil performance in reading and in mathematics in Mozambique

Constructs	**Variables**	**Pupils reading test**			**Pupils mathematics test**		
		Pearson C.	**Sig.**	**N**	**Pearson C.**	**Sig.**	**N**
Teacher training	Read/Mathematics teacher training	-	-	-	.182	.017	171
	Teachers (no teacher training)	-.194	.011	168	-.183	.018	168
	Teacher training (short training)	.220	.004	168	-	-	-
	Teacher training (1 year)	-	-	-	.175	.024	168
	Teacher training (2 years)	.237	.002	168	-	-	-
	Teacher training (more than 3 years)	.183	.017	168	-	-	-
	School head qualification-special training	.170	.028	167	.167	.031	167
Teachers' characteristics	Math teacher sex	-	-	-	163	.034	170
	Read/math T. total possessions at home	.181	.017	173	.176	.021	171
	Reading/math teacher source of lighting	.322	.000	173	.239	.002	171
	School head sex	.168	.031	166	.184	.017	166
	School head age level	-	-	-	.202	.009	167

In the *teacher training construct,* five and four variables respectively out of the 11 had a slight association with pupil performance in reading and mathematics. *No teacher training* had a negative relationship with pupil performance in both subjects, while *school head qualification-special training* had a positive relationship with pupil performance in reading and mathematics. *Teacher training* and *teacher training one year* had a slight relationship with pupil performance in mathematics, while *short training, two years* and *more than three years* of teacher training had a positive effect on pupil performance in reading.

Examining the *teacher characteristics construct, the gender of the school head, teachers' possessions,* and *the source of light* were associated with pupil performance in reading and in mathematics. Taking into consideration that most of the schools (74.5%) were located in urban areas, it seems that in Mozambique perhaps the *source of light* was more related to the teachers' socio-economic status than the school location. For instance, for the remaining 25.5% of teachers in rural or remote areas, there is the difficulty of access to electricity (see Chapter 6, Figures 6.2) for mathematics teachers as there was a slight relationship. Pupils that had female teachers tend to achieve better results than their peers that had male teachers. In addition, schools that had female school heads tend also to achieve better results than those with male school heads. (For more information see Appendix 55 see also Chapter 6, Tables 6.1; 6.7; 6.10 and 6.13; Figures 6.1 and 6.3).

The correlations between teacher training, teachers' characteristics and pupil performance in reading and in mathematics are shown below.

Table 9.7

Correlations between variables for teacher training, teachers' characteristics and pupils' performance in reading and in mathematics in SACMEQ countries

Constructs	**Variables**	**Pupils reading test**			**Pupils mathematics test**		
		Pearson C.	**Sig.**	**n**	**Pearson C.**	**Sig.**	**N**
Teacher Training	Teachers (2 years of teacher training)	.215	.000	2279	.180	.000	2279
	Teachers (more than 3 years)	.179	.000	2279	.173	.000	2279
Teachers' characteristics	Reading teacher sex	.164	.000	2239	-	-	-
	Reading/math teacher total possessions at home	.250	.000	2255	.237	.000	2218
	Reading/math teacher source of lighting	.267	.000	2255	.226	.000	2218
	Reading/math teacher home condition	.179	.000	2255	.196	.000	2218

Several variables related to *teachers' characteristics constructs* were related to *pupil performance in reading (*see Table 9.3). *Two years of teacher training, a teacher's total possessions at home,* and *a teacher's source of lighting* were the variables that had a slight association with pupil performance in reading and in mathematics. Apart from the level of significance, (see Table 55 in appendices) the rest of variables have very weak relationships with reading and mathematics performances with most correlations below 0.20. (See also Appendix 56, Chapter 6, Tables 6.4, 6.9, 6.11; 6.12, 6.14 and 6.15 6.Figures 6.3 and 6.4)

Correlations between pupil performance in reading and in mathematics, and the external and internal teaching contexts, are shown in the Table 9.8.

Table 9.8

Correlations between variables for internal and external teaching context and pupil performance in reading and in mathematics in Mozambique

Domains	Variables	Pupils reading test			Pupils mathematics test		
		Pearson C.	Sig.	n	Pearson C.	Sig.	N
External Teaching Context	The max. number of pup. among shifts	.273	.000	168	.151	.051	168
	Number of classes	.307	.000	168	.196	.011	168
	Number of Grade 6 classes	.239	.002	168	-	-	-
	Ratio girls	.233	.002	168	-	-	-
	Pupils having extra tuition-subject	-.321	.000	176	-	-	-
	Pup. having extra tuition- other subject	-.213	.005	176	-.158	.037	176
	P/extra tuition-payment	-.158	.037	174	-.216	.004	176
	School location	.279	.000	168	.161	.037	168
	Total school resources [max=22]	.185	.017	168	-	-	-
Internal Teaching Context	Borrow books	-.166	.033	166	-.150	.053	166
	Pupils' school material	-.241	.001	176	.193	.010	176
	Pupils' school material	-	-	-	-.292	.000	176
	Writing place	.157	.038	176	-	-	-
	P. sharing/owning reading textbooks	.154	.041	176	-	-	-
	School head/minutes	-.266	.001	167	-.215	.005	167
	School head periods	-.253	.001	168	-.235	.002	168

The variables in *external and internal teaching context constructs* in Mozambique more often had a relationship with pupil performance in reading than in mathematics. In the *external teaching context construct,* nine and five out of 14 variables had a noticeable though slight relationship with pupil performance in reading and in mathematics respectively. In the internal teaching context, six and five out of 16 variables had correlations with pupil performance in reading and in mathematics respectively. In the *external teaching context construct*, the *number of classes, extra tuition, extra-tuition payment,* and *school location* (isolated/rural. small town and large city) had a negative association with pupil performance in reading and in mathematics, as did the *pupils' school material* and *school head periods and minutes* in the *internal teaching construct.*

In the *internal teaching context*, the shortage of *pupils' material* like pencils, exercise books, pens, and other stationery, had a negative effect on pupil performance in reading and in mathematics.

Pupils' borrowing books had little effect on pupil performance in reading. In the Mozambican context, pupils are not accustomed to borrowing books as few schools have libraries. As a result, borrowing books does not play an important role in their reading performance. In all cases, the level of correlation is lower because the explained variation is less than 4% (see Appendix 55, Chapter 7, Tables 7.1 and 7.2; Figures 7.1, 7.2 and 7.3).

Table 9.9

Correlations between variables in external and internal teaching context in SACMEQ countries and pupil performance in reading and in mathematics

Domains	Variables	Pupils reading test			Pupils math test		
		Pearson C.	Sig.	n	Pearson C.	Sig.	N
External teaching context	Number of classes	.190	.000	2279	-	-	-
	Number of classes – Grade 6	.178	.000	2279	.160	.000	2279
	School location	.371	.000	2279	.286	.000	2279
	Pupils-teacher ratio	-.248	.000	2279	-.218	.000	2279
	School building condition	-.227	.000	2279	-.231	.000	2279
	The number of toilets	.277	.000	2279	.243	.000	2279
	Total school resources [max=22]	.425	.000	2279	.390	.000	2279
	Pupils can borrow books	-	-	-	.158	.000	2279
	Pupils extra tuition-other subject	.2.28	.000	2294	.330	.000	2294
	Paying for extra tuitions	-..316	.000	2057	-.382	.000	2057
Internal teaching context	School head minutes	-.127	.000	2277	-.138	.000	2277
	School head periods	-.259	.000	2279	-.252	.000	2279
	Pupils school material (exercise books. pen. pencil etc)	-.299	.000	2294	-.288	.000	2294
	Being given reading/math homework	.192	.000	2294	.310	.000	2294
	Sitting place	.156	.000	2294	-	-	-
	Writing place	.173	.000	2294	-	-	-
	Sharing/owning reading textbooks	-	-	-	.172	.000	2294
	Reading/math teacher total class furniture [max=5]	.154	.000	2242	-	-	-
	Teacher total class resources (max=8)	.154	.000	2242	-	-	-

In Table 9.9, all of the variables in the *external teaching context construct* and the *internal teaching context construct* had an association with pupil performance in reading and in mathematics, with most having a slight or fairly strong relationship. Of these, the *pupil-teacher ratio, the condition of the school building, the number of classroom books, payment for extra tuition, school head periods* and *school head load* had a negative association with pupil performance in reading and in mathematics. The shortage of *pupils' school material* such as pens, pencils, exercise books, and other stationery, also had a negative relationship with pupil performance. Of all the related variables, *school resources* in the *external teaching context construct* was the strongest for both performance in reading and mathematics, whilst the next strongest was s*chool location for reading*, and *paying for extra tuition for mathematics*. (For more information see also Appendix 56; Chapter 7, Tables 7.3-7.5 and Appendix 22; Figures 7.4-7.7).

Table 9.10

Correlations between variables in pre-existing pupils' characteristics and pupil performance in reading and in mathematics in Mozambique

Construct	Variables	Pupils reading test			Pupils math test		
		Pearson C.	Sig.	N	Pearson C.	Sig.	N
Pre-Existing pupils' characteristics	Pupils' age in months	-.270	.000	176	-.155	.040	176
	Pupil sex	.200	.008	176	-	-	-
	Place to stay	-.247	.001	176	-.175	.020	176
	Evening meal	-	-	-	.225	.003	176
	Pupils' SES	.368	.000	176	.216	.004	176
	Grade repetition	.259	.001	176	.179	.017	176
Parent and C. school Involv.	Being asked to read or calculate	-.186	.014	176	-.158	.036	176
	Being asked questions about read/math	-.264	.000	176	-.185	.014	176

Pupils' characteristics, as shown in Table 9.10, had the greatest number of relationships with pupil performance. For instance, five in reading and in mathematics out of the 10 variables had an association with pupil performance, namely: *age, sex, place to stay, pupils' socio-economic status (SES),* and *grade repetition.* SES was the strongest variable, which could be useful for limited prediction of pupil performance in reading, while in mathematics the strongest variable was whether or not they had an evening meal.

In Mozambique, parent and community involvement had a noticeable association with pupil performance in reading and in mathematics, with only two out nine variables having a correlation with pupil performance in reading and in mathematics, namely *being asked to read* or *to calculate* and *asking questions about reading and mathematics.* (For more information, see correlations in Appendix 55, see also Chapter 6, Tables 6.16, 6.17 and 6.18; Figure 6.5).

Table 9.11

Correlations between variables in pre-existing pupils' characteristics and parent involvement in SACMEQ countries and pupil performance in reading and in mathematics

Domains	Variables	Pupils reading test			Pupils math test		
		Pearson C.	Sig.	n	Pearson C.	Sig.	N
Pre-Existing Pupils' Characteristics	Pupil's age in months	-.292	.000	2294	-.318	.000	2294
	The number of books at home	.333	.000	2294	.331	.000	2294
	Pupils' morning meal	.175	.000	2294	.189	.000	2294
	Pupils' lunch meal	150	.000	2294	.169	.000	2294
	Pupils' evening meal	.177	.000	2294	.198	.000	2294
	Pupils' socio-economic status	.497	.000	2294	.450	.000	2294
	Grade repetition	-..328	.000	2294	-.303	.000	2294
	Pupils repeating G6	-.206	.000	2294	-	-	-
Parent and community school Involvement	Community Involvement (factor) - build facility	.302	.000	2279	.255	.000	2279
	Homework-make sure	.299	.000	2289	.251	.000	2289
	Pupils' Homework-Help	.226	.000	2294	-	-	-
	Being looked at the school work	.244	.000	2294	.187	.000	2294

Within the *pre-existing pupils' characteristics construct*, more than half of the variables had a relationship above r = .20 with pupil performance in reading and in mathematics. The strongest correlation found was pupils' SES for both subjects. *Pupils' age, grade repetition, pupils repeating Grade 6, community involvement* and *the maintenance of facilities* had a negative relationship with pupil performance in reading and in mathematics. Kanu (1996) stated that excellent curricula, materials, infrastructure and administration will not improve the quality of education if the quality of teaching is poor. Conversely, good results can be achieved with quality teaching even with poor curricula, materials or infrastructure. The variable, *books in the home,* had a fairly strong positive relationship with pupil performance in reading and in mathematics.

As previously explained, from the results reported above it seems that the data is consistent with the conceptual framework in SACMEQ countries as a whole. (For more details see Appendix 56; Chapter 6, Tables 20-22 and Figure 6.6).

The correlations are presented and discussed to understand to what extent the same pattern is observable in the provinces and in the SACMEQ countries. The next section shows the correlation results in Mozambique by provinces and in individual SACMEQ countries in each component of the conceptual framework.

9.1.3 The Relationship between Teacher Competence and Pupil Performance in Reading and Mathematics and the Domain and Constructs of Teacher Competence Model within Mozambique and in SACMEQ Countries

The next section presents and discusses the correlation between pupil performance in reading and in mathematics and each of the domains and constructs of the conceptual framework in Mozambique and in SACMEQ countries in greater depth.

The cognitive, affective and behavioural domains in Mozambique

After the above presentation of an overview, the results are now presented in detail for each of the domains and constructs for Mozambique. Table 9.12 presents the correlations between pupil performance and variables that comprises the cognitive and affective domains in Mozambique.

Table 9.12

Correlations between variables in cognitive and affective domains and pupil performance in reading and in mathematics across Mozambican provinces

Provinces	CAB		GAZ		INH		MAC		MAN		MAP		NAM		NIA		SOF		TET		ZAM	
Variables	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**
Cognitive Domain																						
P read-all total raw score		.874		.832		.712		.584		.784		.667		.608		.572		.783		.597		.764
T read/math all total score	-	-	.214	.237	.164	.588	-	.248	-	-	.297	.274	-	-	.232	-	-	-	.616	-	-	.218
T qualification-academic	.170	.478	-	.204	.370	.350	.233	.251	-	.692	-	-	-	.227	.337	-	-	.567	-	-	.167	.341
Reading/mathematics goals	.189	.502	-	.194	.271	-	-	.230	.342	.516	-	.553	-	.235	.242	.248	-	.186	.266	-	-	-
T with primary education	-	.264	.437	.396	.408	.595	.223	-	.377	.199	.285	.399	.306	.598	-	.438	-	-	.171	183	-	-
T with secondary education	.416	.337	.160	.150	-	.187	-	.265	.273	-	.337	-	.232	.467	.433	.166	-	-	-	.223	-	-
T with tertiary education	.204	.250	.204	.305	-	.159	-	-	.380	-	.150	-	-	-	.384	.453	-	.319	-	.406	.335	-
R/T having tertiary educat	.280	-	.230	-	-	.414	.355	.271	.233	-	-	.239	-	-	.185	.717	-	.278	-	-	-	.208
SH qualification	-	.311	-	.193	.314	.167	.470	.442	.201	-	.381	.259	.184	.255	-	.424	-	.233	-	158	.274	-
Affective Domain																						
T satisfy-school distance	.619	-	.375	.167	.156	.172	.428	.414	.283	.606	.593	.369	.243	.207	.299	-	.153	.370	.506	.329	.361	.184
T satisf S. building quality	-	.350	.464	.375	.368	-	-	.150	.156	.228	-	.175	.289	-	-	.227	-	-	.307	.173	-	.285
T satisf T house availability	-	.350	.349	-	-	-	.277	.224	.419	-	.337	.471	.251	.156	.155	.276	.334	-	-	.267	.341	.232
T satisf T. house quality	.524	.414	.557	-	-	.416	-	.151	.377	.466	-	-	.215	-	.220	.176	-	-	-	.506	.342	.379
T satisf Cl-furniture qual.	.258	.277	.410	.355	.287	.548	-	-	.163	.312	.284	.145	-	-	.439	-	-	.242	-	.305	-	-
T satisf Level of salary	.467	.455	.154	-	.247	.256	-	.334	.391	.320	-	.248	.245	.153	.216	.369	-	-	.389	.248	.288	-
T satisfy Pupil learn	-	.610	.227	.169	.393	-	-	.158	-	-	-	-	.189	-	.219	-	-	.424	-	.172	-	-
T satisf Sch. Manag. Qualit	389	.372	-	.250	.383	.627	.375	.307	.212	.268	-	.334	.387	-	.255	.321	.230	-	.403	.263	328	.481
T satisf Staff relationship	.217	.610	.452	.353	.188	.154	.212	-	.381	332	.253	-	.335	-	.190	.176	-	-	.243	-	-	-
T satisf Comm .relationship	.191	.382	.234	-	.338	.409	.291	-	.381	-	.291	-	-	-	-	.279	.217	-	.476	-	.188	-
T satisf Promotion opport	-	.430	-	-	-	.308	-	-	.361	.361	.593	.151	429	.163	.261	-	-	-	.427	.395	.261	-
T satisf Further study	-	.434	-	-	.295	.437	-	.231	-	379	-	.389	.264	-	-	.397	-	-	.228	.231	.216	-

Legend: P=pupil; T=teachers; SH=school head; R = reading; M = mathematics
= p ≤ .05
= p ≤ .01
= Not significant; = r ≤ 0.15

Generally speaking, Table 9.12 shows that there was a noticeable relationship between pupil performance in reading and in mathematics and the two domains across provinces. However, pupil performance in reading was a good predictor of pupil performance in mathematics and the correlation varies from $r = .572$ in Niassa to $r = .832$ in Gaza in the cognitive domain. Cabo Delgado had the highest correlation coefficient between pupil performance in reading and pupil performance in mathematics ($r = .874$) which, according to Cohen and Manion (in Creswell, 2002), achieves the highest level of correlation. In the **cognitive domain,** it can also be seen that teacher performance in the reading test, having a *teacher with secondary and tertiary education* and a *school head with an academic qualification* had slight correlation with pupil performance in reading and in mathematics. In Niassa, having a *teachers with tertiary education* was a good predictor of mathematics ($r = .717$). There was no correlation in Sofala province at level of $r = .15$ between pupil performance in reading and the variable that comprised the cognitive domain.

Only five variables had statistical significance at $p \leq .001$ in the **cognitive domain**, namely the relationship between pupil performance in reading and pupil performance in mathematics in Cabo Delgado, Gaza, Manica, Sofala and Zambézia.

In this study, it was expected that teachers' academic qualifications and teacher performance in reading and mathematics tests would have a relationship that is statistically significant and stronger than reported in Table 9.12. Nevertheless, it should be noted that in Inhambane, teachers with only primary education had a positive correlation with pupil performance in mathematics. Of significance, six and three out of 10 mathematics teachers with primary education had, respectively, two and three years of teacher training in Mozambique (for more detail see Appendix 57 and Chapter 6, Tables 6.10 and 6.13).

Some variables had a noticeable relationship with pupil performance in reading and in mathematics in the **affective domain**, and others were useful for limited prediction for pupil performance in reading and in mathematics. Only six variables reached statistical significance ($p \leq .005$), namely *teachers' satisfaction-school distance* and pupil performance in reading in Cabo Delgado ($r = .619$), Maputo Província ($r = .593$) and in Manica ($r = .606$) in mathematics; *teachers' satisfaction-teachers' house quality* and pupil performance in reading in Gaza ($r = .557$); *teachers' satisfaction-pupil performance* in Cabo Delgado ($r = .610$); *teachers' satisfaction-school management quality* and pupil performance in mathematics in Inhambane ($r = .627$) and Zambézia ($r = .481$); *teachers' satisfaction-staff relationship* and pupil performance in mathematics in Cabo Delgado; and finally *teachers' satisfaction-promotion opportunity* and pupil performance in reading in Maputo ($r = .593$). As in the **cognitive domain,** Sofala is the province that had few variables that evidenced a relationship with pupil performance in reading and in mathematics with $r \geq .15$. (For more details see Appendix 58, and see also Chapter 6, Table 6.2).

Table 9.13 presents correlations between pupil performance in reading and in mathematics and the variables that comprised the **behavioural domain** across Mozambican provinces. As indicated in Table 9.13, in Mozambique the majority of variables in the behavioural domain had a slight relationship with pupil performance in reading and in mathematics, or were useful for limited prediction. Only a few variables were good predictors of pupil performance in reading and in mathematics in two provinces, namely in Tete, *pupils' absent-ill* ($r = .694$) in mathematics; and in Gaza *pupils' absent-work* ($r = .788$) and *school activities* ($r = .740$) in mathematics, and *school head experience in this school* ($r = .672$) in reading. As in the cognitive and affective domains, the **behavioural domain** presents few correlations with pupil performance in reading and in mathematics at level of $r \geq .15$. As can see from Table 9.13, only 38 variables had statistical significance at the level $p \leq .05$, and only in Gaza *pupils' absent-work* in mathematics was $p \leq .01$. *Teachers meet pupils' parents/year* is the variable that presents little correlations with pupil performance in reading and in mathematics. In the **behavioural domain**, it was expected that variables in *teachers' approaches* and *years of teaching* would have stronger relationships with pupil performance than that presented in Appendix 59. For more details see Tables of Correlations in Appendices 57, 58 and 59. See also Chapter 6, Tables 6.2; 6.6 and 6.7).

Table 9.13

Correlations between the variables in behavioural domain and pupil performance in reading and in mathematics across Mozambican provinces

Provinces	CAB		GAZ		INH		MAC		MAN		MAP		NAM		NIA		SOF		TET		ZAM	
Variables	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**
Behavioural Domain																						
P days' absent	-	-	.377	.377	.644	.489	.192	.269	.587	.624	.155	-	-	.203	.331	-	.266	.357	-	.251	-	-
P absent –ill	-	.161	.379	.239	-	.239	-	.264	-	.452	.318	212	-	.212	.379	.497	.367	.573	.461	.694	.350	.171
P absent –family	.390	-	.220	-	-	-	.290	-	-	.228	.293	-120	187	.199	.285	-	.238	.290	.270	.274	-	-
P absent –work	.359	.236	.610	.788	.235	198	-	-	.283	.259	-	-	.441	.413	-	-	.547	.473	.383	.273	-	-
P abs fee not paid	.230	.401	.199	-	.268	-	174	145	.361	.345	646	263	-	.291	157	-	-	.233	.556	.245	.315	.188
P speaking Port. home	.125	.183	.186	.236	.611	.455	.218	.151	.387	.363	-	.233	.403	.447	.505	.516	.539	.523	.294	.323	-	.242
Teachers' approach	.384	.530	-	.240	-	.490	.228	.271	.250	.261	.404	.393	.504	.280	.152	-	.239	.613	.202	.268	.271	.169
Teachers' approach	.361	.285	.222	-	-	.407	-	-	.652	.294	-	.314	-	-	-	-	.159	.263	-	-	.152	.191
T years of teaching	.173	.153	.185	.249	.447	.244	-	-	.171	.263	.183		-	.285	.368	.530	-	-	-	.374		.162
T hours outside	-	.398	.273	.155	.367	.297	.546	.386	.553		.310	.281	.202	-	-	.258	.406	.311	-	-	.268	-
T R/M activities	.366	.192	-	.519	.381	-	.354	.151	.437	.362	-	.308	.192	.153	-	.494	-	.538	.231	.208	.273	.288
T R/M activities	.166	-	.282	-	.166	-	.458	-	-	.437	-	-	-	.314	-	-	-	-	.358	.352	.235	.350
T act most import	-	.259	.248	.215	.193	-	-	-	.235	.459	-	.335	.201	-	.216	.488	-	-	.179	.321	-	.177
T par. meet year	.568	-	.396	-	.192	-	-	-	.173	-	-	.305	.238	-	.243	-	-	-	.211	-	-	-
T fr meeting parent	.301	.283	.547	.169	.199	.315	-	-	.355	-	.392	-	.200	-	-	-	.230	.157	.391	.327	-	-
School activities 1	.159	.210	-	.521	.385	.162	-	.305	.387	.332	.445	.259	.162	-	.166	.453	.251	.232	.372	.188	.538	.360
School activities 2	.192	.217	-	.740	.313	-	-	-	.347	.178	-	.313	.207	-	.286	-	-	.191	.269	.402	-	-
T fr giving writing test	-	-	.589	.377	.267	-	-	-	.178	.520	.613	-	.305	.366	-	.290	.213	.154	.573	.349	.181	.210
T reporting comments	-	-	.179	.418	.180	.291	-	.352	.418	.364	.368	.351	.448	.418	.297	-	-	.345	.147	.446	.405	.255
SH activities	.438	.157	.465	-	-	.275	.275	.330	.240	-	.374	.418	.164	.363	.482	.319	.495	.298	.594	.272	.613	.425
SH activities	.206	-	.541	-	-	.210	.394		-	-	.392	.408	.246	.433	-	-	.257	.203	-	.209	.288	.254
SH exp. Altogether	.218	.316	-	.324	.449	-	-	.195	.596	.624	-	.175	-	.199	.170	-	.518	.439	-	-	.294	.422
SH years teaching	.281	-	-	.181		.214	-	.246	-	.187	.519	.508	-	.190	.324	-	-	.322	-	-	-	.218
SH exp. this school	.250	-	.672	.541	.247	.166	-	.265	.418	.418	-	.243	-	-	-	.324	.403	.411	-	-	.410	.446
SH lost days	-	.405	.340	.349	-	.214	-	.354	.645	.385	-	.302	-	-	.520	.582	-	-	-	.189	-	.178
Most import R/M goal	.203	-	.589	.338	.446	-	.362	-	-	459	.202	.435		-	.187	.253	-	.366	-	.425	-	.308

a) The underlined results had a negative correlation with pupil performance Legend: R=reading; M= mathematics; P= Pupils; T =Teachers; SH=school head; fr or f=frequency; rep=report; act=activities; par/parents; exp=experience; sp lan inst home=speaking the language of instruction at home; abs=absent

□ = p ≤ .05

□ = p ≤ .01; □ = r ≤ 0.15

□ = Not significant

The cognitive, affective and behavioural domains in SACMEQ countries

Table 9.14 shows the correlations in the **cognitive** and **affective domains** in each SACMEQ countries. As in Mozambique, a number of relationships were found between pupil performance in reading and in mathematics and variables that comprised the cognitive domain. The correlation between pupil performance in reading and pupil performance in mathematics indicated that 6 out of the 14 systems of education had correlations above r = .86 which, according to Cohen and Manion (1994) (in Creswell, 2002) achieves the highest level. Namibia had the highest correlation between pupil performance in reading and pupil performance in mathematics (r = .906), while Malawi had the lowest (r = .626) which was still a strong association. This pattern means that across countries, if pupils obtained good marks in reading they tended to obtain good marks in mathematics, because reading is a pre-requisite for mathematics, particularly in problem solving (see Chapter 8, Figures 8.4 and 8.20).

Table 9.17 shows correlations for nine variables in the **cognitive domain**. Within the 14 systems of education in SACMEQ countries, Botswana had the greatest number of variables that had a statistically significant correlation with pupil performance (7 out of 9 in reading and 8 out of 9 in mathematics) followed by Namibia (6 in reading and also in mathematics), and South Africa and Zambia (5 in reading and 6 in mathematics). Uganda was found to have the lowest number of associated variables in the cognitive domain and thus the relationship with pupil performance presents the lowest correlations at the level of r = .15. Perhaps this low correlation arises because little variation exists as most teachers went through the same teacher education training process and have a similar level of knowledge. Just as in the case of Mozambique, it was expected that teachers' academic level and teachers' performance in the test would have a stronger relationship with pupil performance than presented in Table 9.14.

Only seven (in reading) and six (in mathematics) out of 14 education systems had an association above r = 0.15 between teacher performance in tests and pupil performance in reading and mathematics. Examining the academic qualifications of the teachers, there were five and four out of 14 that had a significant relationship with pupil performance in reading and in mathematics respectively, while teachers with tertiary education (8 and six out 14 systems of education) had a significant relationship with pupil performance in reading and in mathematics respectively. Just of note, Mauritius and South Africa did not administer the teachers' reading and mathematics test. (For more details, see Appendix 60 and Chapter 6, Tables 6.8, 6.14. to 6.15.)

Table 9.14 also presents the correlations between pupil performance in reading and mathematics and the **affective domain**. As indicated in Table 9.14, 11 out of 14 education systems (the exceptions being Lesotho. Tanzania and Zambia) present some correlation ($r \geq .15$) with pupil performance in reading and in mathematics for variables in the affective domain. Generally speaking, there was a noticeable and useful but limited association between the variables comprising the affective domain and pupil performance in reading and in mathematics.

Table 9.14

Correlations between variables in cognitive and affective domains and pupil performance in reading and in mathematics in SACMEQ II tests

Obs: a) The underlined results had a negative correlation with pupil performance in reading or in mathematics

Countries	BOT		KEN		LES		MAL		MAU		MOZ		NAM		SEY		SOU		SWA		TAN		UGA		ZAM		ZAN	
Variables	R	M	R	M	R	M	R	M	R	M	R	M	R	M	R	M	R	M	R	M	R	M	R	M	R	M	R	M
Cognitive Domain																												
P reading-score	-	.880	-	.895	-	.745	-	.629	-	.906	-	.778	-	.940	-	890	-	.900	-	.744	-	.819	-	.788	-	.830	-	.673
T read/math score	.342	.336	-	-	.236	.278	-	-	-	-	.201	-	.482	.505	358	-	-	-	-	.322	.235	.230	-	-	-	-	.174	.214
T Qualif-Acad.	.192	.167	-	-	-	-	-	-	-	-	-	-	.346	.369	379	-	.300	379	-	-	-		.155	-	-	-	-	.206
Read/math goals	-	-	-	-	-	.201	.186	-	-	-	-	-	.151	-	.176	-	-	-	-	-	-		-	-	.173	.248	-	-
T (Prim. Only)	.153	.189	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	373	.280	-	-	.337	.261	-	.174
T (Sec.)	.199	.181	.210	-	.182	-	.388	.324	.461	.476	.168	-	-	-	.206	271	.203	.232	-	-	.444	.334	-	-	.323	.188	200	-
T (Tertiary)	.291	.267	207	.178	162	-	-	-	-	-	-	-	.323	.278	.269	285	.436	385	.162	-	-	-	-	-	.221	.174	-	-
Sch.qual-acad	.319	.331	.225	.182	-	-	-	-	-	-	.175	-	.394	367	.198	-	.383	.354	-	-	.171	-	-	-	.288	.183	-	-
Ratio T tertiary	.207	.186	-	-	-	-	-	-	-	-	.171	.229	.233	.231	.407	.488	.330	.310	-	-	-	-	-	-	-	-	-	-
Affective Domain (Read/math Teacher Satisfaction)																												
School distance	-	-	-	-	-	-	-	-	-	-	-	-	-	.183	.469	.303	-	-	.172	-	-	-	-	-	-	-	-	-
S building quality	-	-	-	-	-	-	-	-	-	-	-	.218	-	-	-	289	-	-	-	-	-	-	-	-	-	-	-	-
T house availabil.	-	-	-	-	-	-	.168	-	-	-	-	-	.164	-	.564	.483	.180	.189	-	-	-	-	-	-	-	-	-	.202
T house quality	-	-	-	-	-	-	-	-	-	.170	-	-	-	-	.419	-	163	185	-	-	-	-	-	-	-	-	.171	-
Cl-furniture qual.	-	-	-	.228	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	165	-
Level of salary	-	-	-	.161	-	-	-	.187	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pupil learn	-	-	-	-	-	-	.197	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sch. manag. qual.	-	-	-	-	-	-	-	-	.196	.197	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.179	-
Staff relationship	-	-	-	-	-	-	.174	-	-	-	-	-	-	-	-	255	-	-	-	-	-	-	-	-	-	-	-	-
Comm.relationship	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.575	-	-	-	-	-	-	-	172	-	-	-	-
Promotion opport	.153	.167	-	-	-	-	-	-	.187	.196	-	-	-	-	.438	-	168	191	-	-	-	-	-	186	-	-	-	-
Further study	-	-	-	-	-	-	-	-	-	-	-	-	-	.192	224	-	-	-	-	-	-	-	-	-	-	-	-	-

Legend: P=pupils; T=teachers; Qualif=qualification; Acad= academic; math=mathematics; Prim=primary; Sec=secondary Cl= classroom; qual=quality; Sch=school, manag=management; R=reading; M=mathematics

= p ≤ .05
= p ≤ .01
= r ≤ 0.15
= Not significant;

Of the 14 education systems included in the SACMEQ study, Seychelles presented the most positive correlations between pupil performance and some variables in the **affective domain** that had a statistically significant correlation in both subjects. For instance, in Seychelles there was a relationship between pupil performance in reading and the following variables: *teachers' satisfaction-school distance*; *teachers' satisfaction-house availability; teachers' satisfaction-house quality; and teachers' satisfaction-promotion opportunity*. In mathematics, Mauritius and South Africa had more relationships (3) that were statistically significant from the rest of the countries. (For more information see Appendix 61 and see also Chapter 6, Table 6.5.)

Table 9.15 shows the correlation between pupil performance and the variables that composed the **behavioural domain** in individual SACMEQ countries. There were two categories of correlations in the behavioural domain: noticeable relationship and useful for limited prediction. Seychelles was the country that presents the most associations between the variables that made up the behavioural domain and pupil performance in reading and in mathematics, while Malawi had the fewest relationships.

It can be observed in Table 9.15 that in all education systems (except in Zanzibar in mathematics) pupil performance had a statistically significant association with the *pupils' speaking the language of instruction at home*. The strongest correlation was found in Seychelles in reading and in mathematics, while the weakest was found in Namibia in reading and in Lesotho in mathematics. This pattern may mean that speaking the language of instruction has a positive impact on pupil performance not only in reading but also in mathematics. As the more regularly pupils speak the language, the better they perform, possibly because the more confident they become the more they can improve the level of their language skills, such as speaking, comprehension, vocabulary, reading and interpretation.

There were relationships between *pupils' days of absenteeism* and pupil performance in reading and in mathematics in 10 out of the 14 systems of education, namely Kenya, Lesotho (in mathematics), Mauritius, Namibia, Seychelles, and South Africa. Swaziland (in mathematics), Tanzania, Uganda and Zambia. There was also a negative relationship between pupils' performance in reading and in mathematics and *pupils' absent-work* in seven of the 14 education systems: Kenya, Mozambique, Namibia, Seychelles, South Africa, Swaziland (in reading), and Tanzania. The *teachers' approach* (six out of 14 education systems) and years of teaching (four out of 14 education systems) correlated with pupil performance in reading and mathematics.

Examining the results of the **behavioural domain**, it seems that the level of language proficiency is a determinant for pupil performance in both subjects in all SACMEQ countries. A stronger relationship than that presented in Table 9.15 was expected between pupil performance and variables in the behavioural domain, such as *years of teaching* and *teachers' approach in the classroom*. (See Appendix 62 and see also Chapter 6, Table 6.9.)

Table 9.15

Correlations between variables in behavioural domains and pupil performance in reading and in mathematics in SACMEQ II tests

Countries	BOT		KEN		LES		MAL		MAU		MOZ		NAM	
Variables	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**
Behavioural domain														
P. days' absent	-	-	.328	278	-	.173	-	-	.253	.214	-	-	.381	.339
P. absent -ill	-	-	-	-	-	-	-	-	-	-	-	-	.256	.231
P. absent -family	.154	-	-	-	-	-	-	-	.138	-	-	-	.199	.201
P. absent -work	-	-	.312	.284	-	-	-	-	-	-	.326	.292	.347	.314
P. abs fee not paid	-	-	-	-	-	-	-	-	-	-	-	-	.174	
P sp lan inst home	.497	.441	.252	.174	.315	.246	.392	.363	.378	.377	.428	419	.225	.176
Teachers'approach	-	.	-	-	-	-	-	-	-	-	.156	158	.208	.264
Teachers'approach														-
T.years of teaching	.291	.190	-	-	-	-	-	-	149	.172	-	-	.257	.189
T. hours outside	.194	.170	-	-	-	-	-	-	.185	.198	-	-	-	-
T. R/M activities													-	-
T. R/M activities	.225	-	-	-	-	-	-	-	.213	-	-	-	.181	.170
T. R/M activities	.165	-	-	-	-	-	-	-	-	-	-	-	.192	-
T act most import	-	-	-	-	-	-	-	-	-	.154	-	-	-	-
T most import goal													-	-
T par. meet year	.414	-	.287	-	-	-	-	-	.399	-	-	.197	.208	-
Tfr meeting parent			-		-	-	.168	-	-	-	-	-	-	-
School activities	.206	.226	-		-	-	-	-	-	-	-	-	.164	.192
School activities													-	-
Tf giving writt test	-	-	-		-	-	.150	-	.169	-	-	.160	-	-
T.rep. comments	-	-	-		-	-	-	-	-	-	.153	-	-	-
S. head activities	-	-	-	.151	-	-	-	-	-	-	.184	.181	-	-
S. head activities														
S H exp.altogether	-	-	-		-	-	-	-	.196	.205	-	-	.187	-
S H.years teaching	-	-	-		-	-	-	-	-	-	.154	.153	-	-
S head exp.this sch	-	-	-	.152	-	-	-	-	-	-	-	-	245	.193
Sch head lost days	-	-	-		-	-		-	-	-	-	-	-	-

Countries	SEY		SOU		SWA		TAN		UGA		ZAM		ZAN	
Variables	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**
Behavioural domain														
P. days' absent	.635	.640	.169	.169	-	171	.241	.245	.226	.247	.298	.313	-	-
P. absent -ill	148	-	.173	-	-	-	-	-	-	-	-	-	-	-
P. absent -family	.291	242	-	-	-	-	-	-	-	-	-	-	-	-
P. absent -work	.278	.246	.353	.306	.172	-	.328	.334	-	-	-	-	-	-
P. abs fee not paid	.257	.260	.277	.263	-	-	-	-	.192	-	-	-	-	-
P sp lan inst home	.589	.493	.552	.471	.373	.204	.441	.388	.274	.162	.518	.406	.246	.157
Teachers'approach	-	.416	-	.222	-	-	.190	-	-	.276	-	-	-	-
Teachers'approach	.288		-	-	-	-	-	-	-	-	-	-	-	-
T.years of teaching	204	.413	-	-	-	-	-	-	-	-	-	-	-	-
T. hours outside	.341	.466	-	-	-	-	-	-	-	-	-	-	-	-
T. R/M activities	.202									.160				.155
T. R/M activities	.321	.544	-	-	-	-	-	-	-	.279	.204	-	-	-
T. R/M activities	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T act most import	218	.191	-	-	-	-	.265	-	-	-	-	-	-	-
T most import goal	.380													
T par. meet year	.308	.188	.317	-	.304	-	-	-	-	-	-	-	-	-
Tfr meeting parent	-	-	.313	.191		.177	-	-	.155	-	.236	-		-
School activities	.243	.169	.332	.349	.244	.192	-	-	.197	-	.196	155	.214	.237
School activities	.193													
Tf giving writt test	.154	-	.186	-	-	-	-	-	-	-	-	-	-	-
T.rep. comments	-	-	-	-	-	-	-	-	-	-	.248	.183	-	-
S. head activities	-	.334	-	-	.206	-	-	-	-	-	.170	.171	.214	-
S. head activities		.217												
S H exp.altogether	-	-	.194	.181	-	-	-	-	-	-	-	-	.180	-
S H.years teaching	.374	292	-	-	.232	.235	-	-	-	-	-	-	.179	-
S head exp.this sch	.291	186	.206	.197	-	-	-	-	-	-	-	-	-	-
Sch head lost days	-	-	202	.219	-	-	-	-	-	-	-	-	.221	-

a)The underlined results had a negative correlation with pupil performance Legend: R=reading; M= mathematics; P= Pupils; T =Teachers; SH=school head; fr or f=frequency; rep=report; act=activities; par/parents; exp=experience; sp lan inst home=speaking the language of instruction at home; abs=absent

□ = p ≤ .05; □ = r ≤ 0.15

□ = p ≤ .01 □ = Not significant

Teacher training and teacher characteristics in Mozambique

Table 9.16 shows the correlations between pupil performance and *teacher training* and *teachers' characteristics constructs* in Mozambique. As shown in this table, for the majority of the variables that composed the teacher training construct in Mozambique, there was a noticeable relationship with pupil performance in reading and in mathematics, which could be used for limited prediction. In five out of the11 provinces, teacher training was a good predictor of pupil performance in reading and in mathematics, varying from r = .739 in Maputo Cidade to r =.877 in Manica, both correlations relating to *teacher in-service training effectiveness* in reading and in mathematics respectively. *School head weeks' special training* was also a good predictor of pupil performance in mathematics in four provinces, namely Inhambane, Manica, Maputo Província and Niassa. Only one out of 12 variables was statistically significant, that being the *school head's weeks of special training*, and in Maputo Província this was $p \leq .001$. Gaza is the province that had little correlation between pupil performance and the teacher training construct. (For more details see Appendix 63 and Chapter 6, Tables 6.7 to 6.10 and 6.13.)

Table 9.16 also shows the *teachers' characteristics construct* and its correlation with pupil performance in reading and in mathematics. There is a noticeable relationship which is useful for a limited prediction of pupil performance in reading and in mathematics in Mozambique in the *teachers' characteristics construct*. Out of 11 provinces, Inhambane was the only one that obtained two out of seven variables that had statistically significant correlations with pupil performance, namely the teacher's *source of light* for pupils' reading performance, and the *age level of the school head* for pupils' performance in mathematics. In Maputo Cidade, the *source of light*, and the *teacher's age* in Gaza had a statistically significant association with pupil performance in reading. There was a negative relationship with pupil performance in mathematics and *school head age level* in Niassa, but in Maputo Província the relationship was positive. (For more information, see Appendix 64 and Chapter 6, Table 6.1 and Figures.6.1 and 6.2.)

Table 9.16

Correlations between variables for teacher training and teachers' characteristics and pupil performance in reading and in mathematics across Mozambican provinces

Provinces	CAB		GAZ		INH		MAC		MAN		MAP		NAM		NIA		SOF		TET		ZAM	
Variables	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**
Teacher Training																						
R/M Teacher Training	.284	.209	-	-	.465	-	-	.467	.525	-	.182	.195	.360	-	.273	.256	.650	-	.373	-	-	.487
R/M in-service Trg. Effect	.636	-	.334	.484	.231	-	.739	.522	-	.877	-	.334	.195	-	-	.209	.328	-	.420	-	-	-
T. Trg. (1 Year)	-	-	-	-	.449	.539	-	-	.431	.312	-	170	.199	.292	.388	-	.190	.215	.169	-	.202	-
T. Trg. (2 Years)	.229	.180	-	.314	-	.251	-	.216	.474	-	.166	-	-	.199	.161	.165	.285	-	-	.227	.176	-
T. Training. (3 Years)	.411	.329	-	-	.409	-	-	.183	.442	-	.223	-	153	.322	.402	.205	-	.413	-	.455	.274	-
T. Trg. (More 3 Years)	-	.189	.454	.581	-	-	.215	.567	-	.369	.343	-	.248	.386	.221		.282		.176	.290	.345	.176
T. (Short Training)	.373	.388	-	-	.303	.311	-	-	.279	-	-	.294	-	-	.186	.369	.543	.530	-	.500	.396	.241
T. (No Training.)	.189	.237	-	-	.426	.540	.355	.422	.297	-	-	-	.181	-	.601	-	.185	-	.321	-	-	-
Sch. H. T. Training	-	-	-	.196	.388	-	.203	.174	.427	.291	-	.151	-	-	.451	.617	.289	.325	.321	.189	251	.406
S. Head Special Training	.428	.159	.411	.644	.442	.328	.284	-	.392	.244	-	.210	-	.338	-		.219	.240	-	-	.249	-
S.H. Weeks Special Trg	-	-	.285	-	-	.748	.178	-	.658	.814	.470	.783	.653	.326	416	.835	.419	-	-	-	-	-
Teachers' Characteristics																						
R/M Teachers' sex	-	-	.335	-	-	-	-	-	-	-	.230	.165	-	-	-	-	.258	.340	-	.330	.394	-
R/M Teachers' age	257	-	.536	-	.414	.331	-	-	-	.231	.191	-	-	268	.293	.597	-	-	.273	.427	-	.151
R/M T. total possession	-	.269	-	.284	.580	362	.361	-	-	-	-	-	.160	-	.378	.179	-	-	-	.247	.163	-
R/M T. source of lighting	-	.282	.182	.186	.543	.515	.477	.165	-	.253	205	-	-	.233	.352	.446	-	.224	.136	.373	.339	-
R/M T. home condition	-	.221	-	.159	-	-	-	.351	-	-	.196	-	.280	.285	.163	.171	-	-	.275	.214	.372	.273
School head sex	-	-	.314	-	.394	.479	.286	-	-	-	.165	.154	.200	-	-	-	.386	.451	-	-	-	-
School head age	.299	-	-	.250	.402	.568	.152	237	-	.204	.191	.533	-	.262	.254	.230	.251	.316	-	-	-	322

□ = p ≤ .05 R = reading

a)The underlined results had a negative correlation with pupil performance Legend: R= reading; M= mathematics; P= Pupils; T=Teachers; Trg= training; eff=effective; poss= possessions; SH=school head; Qualif=qualification; Sp=special; TH cond=teachers' house condition

□ = p ≤ .05; □ = r ≤ 0.15 □ = p ≤ .01 □ = Not significant

Teacher training and teachers' characteristics in SACMEQ countries

Table 9.17 presents the correlations between pupil performance and *teacher training* in the SACMEQ countries, and shows a noticeable and useful for limited prediction correlation for pupil performance in reading and in mathematics. Across SACMEQ countries at level .15 of correlation, Namibia and South Africa (six out of 11variables in reading and in mathematics) and Botswana (five out of 11 in reading and six in mathematics) were the countries that had the most relationships between teacher training and pupil performance in reading and in mathematics. Only five systems of education in the SACMEQ countries present a noticeable relationship between professional training and pupil performance, namely Mozambique (in mathematics), Namibia, Seychelles (in reading), South Africa and Tanzania (in mathematics).

There was a positive relationship between *teachers without training* and pupil performance in reading and mathematics in Kenya and Mauritius. However, these teachers had senior secondary or A-levels in Kenya, and in Mauritius they had tertiary education (see Chapter 6, Table 6.12 and 6.15). Five school systems, namely Botswana, Namibia, South Africa, Swaziland (in mathematics), and Zambia had positive correlations between pupil performance and school head teacher training. Botswana was the country that presented the most variables that had relationships between pupil performance in reading and mathematics and the three variables related to a school head, such as *school head qualification- teacher training*, s*chool head qualification-special training*, and *number of weeks-special training.* As in Mozambique, it was expected that teacher training would have impacted more on pupil performance in reading and mathematics than presented in Table 9.17. (See Appendix 65; see also Chapter 6 Tables 6.9, 6.11; 6.12; 6.14 and 6.15).

Table 9.17 also presents the correlations between pupil performance in reading and in mathematics and the *teachers' characteristics construct* in SACMEQ countries. As indicated in Table 9.17, the *teachers' characteristics construct* in SACMEQ countries had a noticeable and useful but limited predictive capability for pupil performance in reading and in mathematics. Of the 14 education systems, Zambia was the country with most variables exhibiting significant relationships with pupil performance in reading (six out of the seven variables), followed by Mozambique (five out of seven). Zambia was followed by Namibia (5 in reading and 4 in mathematics) and Botswana (four in reading and also in mathematics). The countries with the fewest significant relationships were Lesotho (two out of the seven) and Zanzibar with none.

The *source of light* in a teacher's home appears as an important variable in all SACMEQ countries except in Mauritius and Seychelles, and generally had either a noticeably significant relationship or a less strong relationship (useful for limited prediction of pupil performance in reading and in mathematics). *Teachers' source of light* as a variable was closely associated with pupil performance in both subjects in all countries, except Kenya, Uganda and Zanzibar, where the relationship was in mathematics only. All teachers had electricity as a source of lighting in Mauritius and Seychelles. (See Chapter 6, Figure 6.4.) In seven of the 14 systems of education, namely Kenya, Malawi, Tanzania, Zambia, Mozambique (in mathematics) Namibia and South Africa (in reading), having a female teacher correlated with pupil performance in reading and in mathematics.

In 12 and eight of the 14 systems of education respectively, teachers' possessions and teachers' home conditions correlated with pupil performance in reading and in mathematics. Among the variables that composed teachers' characteristics constructs, the *age of the school head* had the weakest relationship with pupil performance, with only Mozambique in mathematics and Zanzibar in reading presenting some correlation in one subject only. (For more information see Appendix 66 and Chapter 6, Tables 6.4, Figures 6.3 and 6.4).

Taking into consideration the level of teacher training in some countries (see Chapter 6, Table 6.9), it was expected that teacher training would have stronger correlation with pupil performance than presented in this section. The problem is that most teachers in some SACMEQ countries received the same level of teacher training, and it was therefore not possible to calculate a correlation.

The results emerging from pupil performance in the SACMEQ tests (See Chapter 8, Figures 8.2 and 8.18) give some indication of the quality of teaching in SACMEQ countries and consequently, the quality of teacher training, and may therefore be of value in informing future revision of the curricula for teaching training programmes.

Table 9.17

Correlations between variables for teacher training and teachers' characteristics constructs and pupil performance in reading and in mathematics in SACMEQ II tests

Countries	BOT		KEN		LES		MAL		MAU		MOZ		NAM		SEY		SOU		SWA		TAN		UGA		ZAM		ZAN	
Variables	R	M	R	M	R	M	R	M	R	M	R	M	R	M	R	M	R	M	R	M	R	M	R	M	R	M	R	M
Teacher Training																												
R/M Teacher Trg	-	-	-	-	-	-	-	-	-	-	-	.182	.329	.322	.308	-	.388	.407	-	-	-	227	-	-	-	-	-	-
R/M ins Trg. effe	-	-	-	-	-	-	.212	-	-	-	-	-	-	-	.232	-	.198	234	.226	-	.296	.305	-	-	.257	234	-	-
Teach. (NoT.Trg)	.194	.157	.153	.170	-	-	-	-	.185	.195	.194	.183	.260	.215	.291	.212	-	-	.260	-	-	-	-	-	-	-	-	-
Teachers (Short)	-	-	-	-	-	-	.182	.177	-	-	.220	-	-	-	-	-	-	-	-	-		-	.179	-	-	-	-	-
Teachers (1 Year)	-	.208	-	-	-	-	.206	-	-	-	-	.175	-	-	-	-	-	-	-	-	-	-	-	-	.239	-	-	-
Teach. (2 Years)	-	-	.378	.274	-	-	.398	.343	.208	.164	.237	-	.182	.247	-	.196	267	298	-	-	.459	.330	.299	.198	.543	.429	.311	-
Teach. (3 Years)	-	-	.151	-	.201	-	.152	-	.183	.214	-	-	.244	.166	-	-	.158	.221	-	-	-	-	-	-	-	-	-	-
T.(More 3 Years)	.574	.608	-	-	-	-	-	-	-	-	.183	-	.624	.644	-	-	.596	.629	.359	.196	-	-	-	-	.246	.217	-	.251
Sch. H.Qua.T.Trg	.335	.327	-	-	-	-	-	-	-	-	-	-	.430	.391	-	-	.375	.343	-	.163	-	217	-	-	.245	.160	-	-
S. Head Spec.Trg	.217	.193	-	-	-	-	-	-	-	-	.170	.167	-	-	-	-	-	-	-	-	-	-	.153	-	-	-	-	.915
S.H.WeeksSp.Trg	.336	.350	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.231	.186	-	-	-	-	-	-	-	.277
Teachers Characteristics																												
Read/math T sex	-	-	.314	.183	-	-	.378	.301	-	-	-	163	.233	-	289	-	.210	-	-	-	.345	.241	-	-	.498	.306	167	-
Read/math T age	.316	.164	-	-	-	-	-	-	-	.185	-	-	.246	.180	160	.356	-	-	-	-	-	-	-	-	154	-	-	-
R/M T poss home	.293	.186	.214	-	.202	-	-	-	-	.179	.181	.176	.532	.587	157	.279	.275	.269	.306		.291	-	.232	.171	.550	.429	-	-
R/M T. lighting	.387	.276	.325	-	.274	.210	.317	.317	-	-	.322	.239	.449	.469	-	-	.242	.164	.361	.154	.401	.302	.272	-	.569	.376	.217	-
R/M T H conditio	.282	.222	-	170	-	-	-	-	-	-	-	-	.374	.449	-	-	.303	.303	.173	-	.187	-	.159	-	.154	-	-	-
School head sex	-	-	240	.177	-	-	-	-	-	-	.168	.184	-	-	-	-	-	-	-	-	.191	.166	.183	-	.369	.337	.271	-
School head age	-	-	-	-	-	-	-	-	-	-	-	.202	-	-	207	-	-	-	150	-	-	-	-	-	-	-	.210	-

a)The underlined results had a negative correlation with pupil performance Legend: R= reading; M= mathematics; P= Pupils; T=Teachers; Trg= training; eff=effective; poss= possessions; SH=school head; Qualif=qualification; Sp=special; TH cond=teachers' house condition

= p ≤ .05; = r ≤ 0.15 = p ≤ .01 = Not significant

The external and internal teaching contexts in Mozambique

The correlations between pupil performance and variables that compose the *external* and *internal teaching constructs* in Mozambique are presented in this section. Table 9.18 shows the correlations between pupil performance and the *external and internal teaching context constructs* in Mozambique.

Across the external and internal contexts, only one variable was highly correlated and statistically significant in more than two provinces: *school heads periods* in Cabo Delgado (reading), Gaza (reading and mathematics) and Niassa (mathematics). The highest number of strongly correlated and statistically significant variables was found in Zambézia: *paying extra tuition* and *school location* (reading and mathematics).

As referred to earlier in this chapter, *total school resources* were made up of 22 items in the *external teaching context construct*. There are usually shortages of school resources in Mozambican governmental schools (see Chapter 7, Tables 7.5 and 7.6). The slight and useful correlations might be a reflection of the lower variation within and between schools in terms of school resources. Nevertheless, *total school resources* ($r = 0.779$) has a very strong relationship to pupil performance in reading in the Tete province.

In the *external teaching context,* some variables had statistical significance at the level of $p \leq .05$ in six provinces, namely Cabo Delgado with *pupils' extra tuition* in reading; *pupils' extra tuition-other subjects* in Inhambane in reading and in mathematics; *paying extra-tuition* in Zambézia in reading and in mathematics; and in the same province, pupil performance in reading and in mathematics was associated with *school location*. *Pupils can borrow books* in Gaza, and the *number of shifts* in Niassa had a negative relationship that was statistically significant with pupil performance in mathematics and in reading. *Total school resources* and the *ability to borrow books* had relationships that were statistically significant with pupil performance in mathematics in Maputo Província. (For more information, see Appendix 67.)

Table 9.18 also presents correlations between pupil performance in reading and mathematics and the *internal teaching context* in Mozambique. As can be seen, the *internal teaching context construct* is comprised of variables related to the classroom environment. The internal teaching context construct produces the same problems as the external teaching context construct in Mozambique where it is common for there to be a shortage of books and basic materials from Grade 1 to 7 (see Chapter 7, Tables 7.1 and 7.2; Figures 7.1, 7.2 and 7.3)**.** Like the external teaching context construct, the internal teaching context construct is a challenge for the MEC, as it needs to provide classroom furniture, textbooks for all pupils, and teacher classroom resources. As explained in Chapter 2, in order to improve the quality of education, the MEC introduced changes in the production of textbooks through the development of the National Book Policy – a change that involved the private sector in the process (Strategic Plan for Education, 1998) but this seems to be an ongoing problem not only for Mozambique but for many other cash-strapped SACMEQ countries.

Table 9.18

Correlations between variables in the external and internal teaching context and pupil performance in reading and in mathematics across Mozambican provinces

Provinces	CAB		GAZ		INH		MAC		MAN		MAP		NAM		NIA		SOF		TET		ZAM	
Variables	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**
External teaching context - construct																						
P extra tuition-R/M	.545	.186	-	.245	.523	.529	-	-	.222	.431	.268	-	.152	-	.229	.450	-	.442	.370	.253	.238	-
P ext tuit-other sub	.277	-	.150	-	.554	.543	-	224	.513	.170	.457	-	.170	-	-	-	-	-	.210	-	.371	.415
Paying extra tuition	.328	.183	.153	334	.332	.241	-	.245	-	.375	293	.212	-	.385	.320	350	.193	370	-	-	.588	.500
School location	-	-	.316	.307	-	-	-	.314	.178	-	384	-	.355	.243	.219	-	.163	.424	-	.407	.624	.471
Pupil-teacher ratio	.334	.295	-	.191	.515	.445	.305	-	.397	-	-	-	-	-	-	.171	.201	.271	.207	-	.311	.385
Max No pup/shifts	.489	.370	-	-	-	.180	.175	.201	.280	-	.413	-	.216	-	.523	.172	-	.337	-	.353	.320	-
Number of shifts	-	-	.246	.301	.323	.311	-	.256	-	-	.409	.478	.263	254	.599	.183	-	-	-	.163	.160	-
Ratio girls	-	-	-	-	.314	-	.278	-	.334	-	.258	-	.157		.316	-	.195	-	-		.278	-
No Class & pupils	.436	.314	.154	.228	-	.241	-	.407	.271	-	.381	-	.291	.211	.498	-	-	.236	-	..236	.223	-
No of cl Gr 6	.343	.217	-	-	-	-	301	-	-	.268	.357	.323	.175	-	.346	.495	.327		.561	.331	.312	-
Sch building cond	.177	.269	-	-	.390	.155	.255	.168	.208	.258	.353	.474	-	-	.312	.211	-		-	-	.233	.307
No of toilets	.357	.370	.246	-	-	-	-	.239	.498	-	-	.259	.200	-	-	-	.196		.160	-	.151	-
Total Sch resources	-	.179	-	-	.415	.179	.455	.340	.257	-	.311	.570	-	-	-	241	-	.406	.779	.474	-	-
P borrow books	.196		.364	.566	.189	.164	.230	-	.422	-	-	.613	-	.274	-	.254	.295	.324	.219	.419	.372	.210
Internal teaching context – construct																						
Borrow books	-	-	.275	.329	-	-	.338	.452	.522	.395	.293	.172	-	.202	-	-	-	.187	.277	-	-	-
P school material	-	-	-	323	.393	.536	-	.238	-	-	-	-	-	-	.157	.175	-	.265	-	.347	.550	.332
P school material	.321	.581	-	.240	.507	.204	.252	-	-	-	-	.379	-	.162	.230	-	.151	-	.353	.217	-	-
Sitting place	.529	.346	-	-	-	.220	.270	.160	.355	.394	.197	.296	-	-	-	.223	.465	.425	.588	.299	-	-
Writing place	.613	.441	-	-	-	.186	.254	.203	.181	-	.153	-	-	-	.215	.297	.439	.393	.573	.297	-	-
Given R/M HW	-	-	-	-	.258	.228	.352	.340	-	.277	-	.322	-	-	.194	.358	-	.185	.272	.321	-	.160
Correct R /M HW	-	.213	-	.514	-	.298	-	-	.675	.542	-	.550	-	-	.178	-	-	-	-	.366	.179	-
P R/M textbooks	.497	.439	417	-	-	.548	.314	-	171	-	.317	.333	-	-	-	-	-	-	-	.190	.198	-
R/M Cl Size	.417	.475	.153	-	.511	.280	.300	.408	.176	-	-	.158	-	.214	.354	.455	.485	.342	.272	.355	-	-
No of cl books	-	.333	.220	.304	.335	.187	.254	.304	.362	-	-	.349	.259	-	.184	.307	.338	.194	.391	.378	.179	-
TT cl furniture	-	.303	.602	.342	.219	-	-	.447	.717	.162	.612	.701	.278	.259	.425	.354	-	.461	.389	.314	.184	.338
TT cl resources	-	.205	.222	-	-	-	-	.354	.520	.210	.253	.440	-	.177	.382	.238	-	-	339	-	-	.238
Teacher periods	-	.390	.345	580	.427	.247	.319	-	.355	.538	-	.174	.211	-	-	-	.361	.439	-	-	-	.164
Teacher minutes	-	-	-	-	-	-	-	-	-	-	747	.551	-	-	-	-	.250	-	-	-	-	.352
SH periods	.523	.566	.639	.603	.246	.418	.298	-	.400	-	-	.362	.216	-	.238	.537	-	223	.410	.366	.354	.227
SH minutes	-	-	-	-	-	.356	.286	-	.422	-	-	.292	-	-	.272	.440	.322	-	.423	.343	-	-

a)The underlined results had a negative correlation with pupil performance Legend: R= reading; M= mathematics; P= Pupils; T=Teachers; No=number; Cl=class; Max=maximum; Sch=school; SH=school head; TT=total; HW=homework. □ = p ≤ .05; □ = r ≤ 0.15 □ = p ≤ .01 □ = Not significant

The slight and useful correlation in Mozambique might be a reflection of the shortage of internal teaching context variables and the lower variation within and between schools. Nevertheless, two out of 11 provinces had strong relationships with pupil performance, namely Manica: *correcting reading homework* (r = .675*)* and *total class furniture* (r = .717*)*; and Maputo Província: *teacher minutes* (r = .747*)* and *total class furniture* (r = .701*). Teacher minutes* and *total class furniture* are the two variables for which the relationship was statistically significant at $p \leq .01$, while the rest of the variables were significant at $p \leq .05$. However, there was also a negative correlation between pupil performance and some variables that constituted the internal teaching context, such as *teachers' periods and school head periods.* Usually the overload of number of periods that teachers and school head tend to have, had negative effects on pupil performance. (For more information, see Appendix 68.)

External and internal teaching context in SACMEQ countries

Table 9.19 shows the correlation between *external teaching context construct* variables and pupil performance in reading and mathematics in SACMEQ countries. There was a noticeable relationship useful for limited predictions in all SACMEQ countries, between pupil performance and variables in the external teaching context, except in Namibia (two in reading and one in mathematics) and South Africa (two in reading), where *school location* and *school resources* were good predictors of pupil performance in reading and in mathematics. Namibia had more variables (10 out of 12) that related to pupil performance, while Uganda had fewer variables that had an association with pupil performance in reading and in mathematics and the external teaching construct.

Namibia was the country that presented the most variables that associated with pupil performance (11 out of 13 variables in reading and mathematics) and external teaching constructs. Namibia was followed by Zambia (10 out of 13 variables in reading and in mathematics), Tanzania (10 out of 13 variables in both subjects) and South Africa (nine out of eight variables in reading and in mathematics respectively).

School resources were related to pupil performance except in Mauritius and Mozambique in mathematics. *School location* was also associated with pupil performance in all countries except in Mauritius, and in Uganda and Zanzibar in mathematics. The *condition of school buildings* and the *pupils/teacher ratio* had a negative relationship with pupil performance in reading and in mathematics. The variables that comprise the *external teaching context construct* were statistically significant in all of the school systems except for some variables in Seychelles (4), Mozambique (1) and Swaziland (1). Examining SACMEQ countries, Seychelles had the best conditions in terms

Table 9.19

Correlations between variables for external and internal teaching constructs and pupil performance in reading and in mathematics in SACMEQ II tests

Countries	BOT		KEN		LES		MAL		MAU		MOZ		NAM		SEY		SOU		SWA		TAN		UGA		ZAM		ZAN	
Variables	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**
External teaching context - construct																												
Number of shifts	-	-	-	-	-	-	-	.232	-	-	-	151	-	-	-	-		-	-	-	.180	-	-	-	.291	-	-	-
Max. No pup/shifts	-	-	-	-	.189	-	.310	.295	.465	.480	.273	-	.242	.169	-	-	-	-	-	-	.386	.284	-	-	.477	.343	-	-
No. Class & pupils	-	-	-	-	-	-	.256	.210	.415	.433	.307	.196	.380	.329	-	-	.300	.262	-	-	.318	212	-	-	.500	.292	173	-
No of classes –Gr 6	-	-	239	.174	.161	-	.321	.267	291	.274	.239	-	.263	.190		-	.200	-	-	-	.313	.245		-	.541	.335	-	-
School location	.435	.305	.400	.306	.381	.421	.370	.292	-	-	.279	.161	.685	.614	.283	.245	.681	.582	.394	.203	.480	.362	.232	-	.603	.419	.348	-
Pupil-teacher ratio	.236	.337	.348	.328	-	-	.169	-	-	-	-	-	.294	.309	.182	.222	-	-	-	-	.261	.236	-	-	.346	.317	-	-
Sch. building cond	-	.170	.272	.289	-	.224	-	-	-	-	-	-	.347	.335	-	.160	.450	.411	.188	.211	.179	.173	.211	-	-	-	-	-
Number of toilets	.421	.368	.382	337	.156	-	.308	.205	.303	.313	-	-	.600	.570	-	-	369	.342	.369	.258	-	-	-	-	.476	.373	-	-
Total Sch resources	.555	.574	.504	.444	.462	.360	.348	.256	-	-	.185	-	.730	.688	.381	.408	.727	.659	.462	.322	.233	.190	.425	.230	.644	.478	.243	157
Pup. borrow books	.322	.353	.212	.214	-	-	-	-	-	-	-	-	.233	.230	-	-	.647	.622	.254	.181	-	-	-	-	-	-	-	-
P extra tuition-R/M	-	-	-	-	-	-	-	-	.226	.285	.321	-	.253	.200	-	-	.378	.279	.266	.201	-	.358	-	-	-	.188	-	.209
P ext tuit-other sub	.167	-	-	-	-	-	-	-	.467	.503	.213	.158	-	-	-	-	-	-	-	.209	.155	.237	-	-	.254	.169	.191	.154
Paying extra tuition	-	-	-	-	-	-	-	-	.203	.285	.158	-	.208	.187	.622	.660	.288	324	-	.163	.284	.254	-	-	.391	.282	.258	-
Internal teaching context – construct																												
Borrow books	-	-	.244	-	-	-	-	-	.167	-	.166	-	-	-	.413	330	.260	.320	.157	-	-	-	-	-	.183	.198	-	.153
No of class books	-	-		-	-	-		-	.160	187	-	150	-	-	194	.318	-	-	-	-	-	-	-	-	-	-	-	.206
P. school material	-	.177	.175	.171	.173	-	.335	.251	-	-	.240	.268	.194	.223	299	362	.348	.322	.198	.200	-		.319	.289	-	-	.345	.183
Sitting place	-	-	.247	.196	-	-	-	-	-	-	-	-	-	-	-	-	.265	-	-	-	.489	.406	.266	.177	-	-	-	-
Writing place	-	-	.251	.172	-	-	-	-	-	-	.157	-	-		-	-	249	.156	-	-	.443	.364	.196	.207	.202	.196	-	-
Read/math Cl Size	-	-	-	-	-	-	.233	.193	.426	480	-	-	.250	.282	-	-	.227	.214	-	-	.219	.182	-	-	.292	.248	.176	-
P. R/M textbooks	-	-	.266	.354	-	-	-	-	-	-	.154	-	.310	.384	.453	-	.182	.284	-	-			-	-	.191	.154	-	-
Given R/M HW	-	.211	.226	.287	-	-	-	-	-	.320	-	-	.234	.303	-	-	.196	.372	-	-	.381	.318	-	.171	332	.221	-	-
Correcte R /M HW	.252	-	255	.230	-	-	-	-	-	-	-	-	.164	-	.169	-	-	-	.183	-	.253		.288	.265	.181	-	-	.162
T access material	-	.195	-	-	.172	-	-	-	-	-	-	-		.182	.276	-	.246	.235	-	-	-	.161	.209	-		-	-	.155
Total clas furniture	-	-	.412	.329	-	-	-	-	-	-	-	-	.409	.419	-	-	.418	.418	.258	-	-	-	-	-	.239	.151	-	-
Total cl. resources	-	-	.387	.272	-	-	-	-	-	-	-	-	.416	.402	-	209	.421	.415	.322	.230	-	-	-	-	.166	-	-	-
Teacher periods	-	-		-		-	.230	167	-	-	-	-	-	-	.313	-	.245	.170	-	-	.326	.386	.177	-	.162	-	-	-
Sch. Head periods	-	-	.452	.368	-	-	.167	.199	-	-	.253	.235	.237	.177	-	249	.253	.187	-	-	-	.418	-	-	.449	.320	.226	-
Sch. Head minutes	-	-	-	-	.176	.195	.254	-	-	-	.266	.215		-	.232	278	-	-	-	-	.459	-	-	-	.218	.243	-	-

a) The underlined results had a negative correlation with pupil performance. **Legend:** R= reading; M= mathematics P= pupils; T =teachers; H/W =homework; SH=school head; Max=maximum; No.=number; cl=classroom; Sch=school; ext tuit-other sub=extra tuition-other subjects

□ = p ≤ .05; □ = r ≤ 0.15

□ = p ≤ .01 □ = Not significant

of resources allocated to schools. (For more details see Chapter 7, Figure 7.7 and also Appendices 22 and 69.)

Table 9.19 presents the correlations between pupil performance and the *internal teaching context*. There was a statistically significant relationship with limited predictive potential for pupil performance in reading and in mathematics in all school systems in SACMEQ countries except in Seychelles (nine variables), Kenya (one variable), Mozambique (one variable), Swaziland (two variables), and Zanzibar (one variable). South Africa (12 out of 15 in reading and 11 out of 15 in mathematics), Botswana (10 out of 15 in reading and 9 out 15 in mathematics), and Zambia (11 out of 15 in reading and eight out of 15 in mathematics) were the countries that were found to have the most relationships between the variables that comprised the internal teaching context construct and pupil performance in reading and mathematics.

Pupils' school material had an association with pupil performance in reading in 10 of the 14 SACMEQ systems of education and in mathematics in nine of the systems. The shortage of pupils' *school material* such as exercise books, pens, pencils and other stationery had negative correlations with pupil performance in reading and in mathematics in all education systems except in Lesotho in reading and in Zanzibar in mathematics. Botswana and Lesotho had lower levels of correlation between pupil performance and variables in the internal teaching context construct, a fact which may be related to the low variation among schools. (See Appendix 70 and Chapter 7, Tables 7.3 and 7.4; and Figures 7.4 to 7.6.)

The next section presents the correlations between pupil performance and pre-existing pupils' characteristics, as well as parent and community school involvement.

Pre-existing pupils' characteristics and parents and community involvement in Mozambique

Table 9.20 shows the correlations between pupil performance and variables for pre-existing pupils' characteristics as well as parents and community school involvement in Mozambique. As in other domains and constructs in Mozambique, there was a noticeable and but useful if limited association between pupil performance in reading and in mathematics. A number of variables found under *pre-existing pupils' characteristics construct* had fairly strong or strong relationships with performance. *Pupils' age* (r = 0.816) in mathematics, and *morning meal* (r = 0.658) with reading in Niassa; *pupils' sex* (r = 0.752) in mathematics in Tete; the *evening meal* (r = 0.707) and *socio-economic status* in Inhambane (r = 0.662) and also in Zambézia (r = 0.729) in reading. In some provinces, some variables had a relationship with pupil performance that was statistically significant, such as the *evening meal* in Gaza in reading, and in both subjects in Inhambane. *Grade repetition* had a positive relationship with pupil performance in mathematics in Gaza, but was negative in Sofala.

Pupils' age had negative correlations with their performance in Inhambane in mathematics and in Zambézia in reading. In Tete, there were associations between pupils' performance in mathematics and *gender*, namely that boys tended to achieve better results than girls in mathematics (see Chapter 8, Figure 8.8), but in Niassa, *pupils' age* had a positive impact on reading and on mathematics, as did *pupils' SES* in Inhambane and Zambézia in reading. *Meals* appear as an important variable in terms of their strong correlation with pupil performance in four provinces. (For more information see Appendix 71. See also Chapter 6, Tables 6.16, 6.17 and 6.18.)

Table 9.20 also shows the correlation between pupil performance in reading and in mathematics and variables for *parents and community school involvement* in Mozambique.

Table 9.20

Correlations between variables for pre-existing pupil characteristics and parents and community involvement and pupil performance in reading and in mathematics across Mozambican provinces

Provinces	CAB		GAZ		INH		MAC		MAN		MAP		NAM		NIA		SOF		TET		ZAM	
Variables	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**
Pre-Existing Pupils' Characteristics																						
Pupil's age	.330	.408	-	-	.515	.580	.232	.186	.246	.206	.275	.336	.308	-	.526	.816	.226	.427	.436	-	.472	.217
Pupil sex	.155	.211	.344	.249	.617	.256	.180	.307	438	-	.206	.216	.170	.402	.182	-	.212	.394	.268	.752	.432	-
P place to stay	-	-	.371	.456	.173	.204	.235	-	-	.330	.507	.416	-	-	.464	.369	-	-	-	.423	-	-
No books at home	.127	.452	.190	-	.266	-	.290	-	-	.185	-	-	-	-	-	.206	-	225	-	.379	.586	.383
P. morning meal	.166	-	413	-	.466	.436	-	-	.633	.647	.267	.176	.269	-	.658	.389	-	.202	.278	.250	.446	.241
Pupils' Lunch	.265	.216	.341	.303	.427	.166	.371	.283	.370	-	-	-	-	-	.398	-	.425	383	-	.154	-	-
P. evening meal	.375	.426	.518	.412	.707	.542	.205	-	.507	.399	.417	.430	.257	-	.312	-	.357	.406	.186	-	-	.169
Pupil's' SES	.359	.226	.174	.224	.662	.474	-	-	-	.403	.273	.153	-	-	.242	.348	.230	.442	274	.399	729	.434
Grade repetition	.210	-	.389	.601	.127	.197	.366	-	.373	.314	-	-	.376	.168	.268	-	.348	.518	.317	.361	.234	.184
P repeating G6	.155	-	-	.159	-	-	-	.160	-	-	.317	.238	.407	-	.207	-	.282	.306	-	.179	-	.209
Parents and community School involvement																						
HW-make sure	-	-	.151	-	.332	.282	.481	.402	.272	.366	-	.161	-	.396	.166	.395	.293	.207	.243	.448	.360	.576
P' HW-help	.316	.427	-	-	224	.200	-	-	-	-	.174	-	-	.189	.441	.179	-	-	-	-	.217	.344
Asked to R/Calc	.172	.376	.315	-	-	.265	.241	-	-	-	.162	.658	-	-	-	.413	-	.495	-	-	-	-
Asked Q R/M	.189	556	.675	.356	253	.216	-	-	.458	.171	.166	-	-	-	.237	.397	.161	379	.404	.218	.159	.203
Looked SW	-	240	153	-	-	.259	-	.229	-	-	-	249	.181	-	.332	.614	.218	.183	.289	-	.439	.325
T ask par to sign	-	-	612	.320	-	.273	.177	-	.208	.430	.503	.559	-	.242	.431	-	-	.335	.417	-	.260	.148
Community contr	-	-	-	-	.245	.333	-	-	-	.150	.162	-	.247	.370	.536	.247	.230	-	.491	.318	-	-
Community contr	.368	.472	276	-	.209	-	.328	-	.341	.200	-	-	-	-	.412	.346	-	.154	.437	.168	.318	.319
Comm. problems	.280	-	-	-	-	.255	.375	.508	-	-	.333	-	.349	-	212	-	.477	.403	.240	-	-	-

a)The
underlined results had a negative correlation with pupil performance. **Legend:** R= reading; M= mathematics P= pupils; T =teachers; HW =homework; No=number; Q=question; Calc=calculate; SW=school work; par=parents contr=contribution; comm.=community □ = p ≤ .05; □ = r ≤ 0.15 □ = p ≤ .01 □ = Not significant

Variables that comprised the *parents' and community involvement construct*, such as being *asked questions about reading*, had a fairly strong relationship with pupil performance in reading except in Gaza, where the correlation coefficient was r = .675. There were statistically significant associations between *homework makes sure* and pupil performance in Maputo Cidade in reading and Zambézia in mathematics; between being *asked to calculate* in Maputo Província in mathematics; between *looked at school work* in Niassa in mathematics, in Gaza in reading, and in Maputo Província in mathematics; *teacher asking parents to sign* and finally *community contribution and community problems.* (For more information, see Appendix 72 and also Chapter 7, Table 7.9.)

Pre-existing pupils' characteristics and parents and community involvement in SACMEQ countries

Table 9.21 shows the correlation between pupil performance in reading and mathematics and variables for *pre-existing pupils' characteristics* and *parent and community school involvement* in SACMEQ countries. Pre-existing pupils' characteristics had more relationships with pupil performance in reading and in mathematics than any other domain or construct. This pattern may mean that pupils' performance was more closely related to the individual pupils' characteristics rather than to school variables like the condition of the school, the availability of learning resources, teachers' performance, and the like.

It can be seen in Table 9.21 that there was a noticeable but slight relationship in all SACMEQ countries between pupil performance and variables in the pre-existing pupils' characteristics construct. The exceptions were found in Botswana with number *of books at home* in reading and in mathematics, and *SES* in reading and in mathematics in the school systems of Botswana and Kenya (in reading), Namibia, Seychelles, South Africa and Zambia (in reading) and finally, *grade repetition* in South Africa (in reading) were good predictions of pupil performance in reading and in mathematics.

Among the factors making up the *pre-existing pupils' characteristics* variables, *pupils' socio-economic status (SES)* had relationships with pupil performance in all school systems, ranging from r = .216 in mathematics in Mozambique to r = .798 in reading in Namibia. SES was followed by *grade repetition*, where the correlation was significant in 12 of the 14 systems in reading and 11 of the 14 in mathematics, and then by the *number of books at home*, where the correlation was significant in 12 of the 14 systems in reading and nine of the 14 in mathematics. In the school systems of all SACMEQ countries, grade repetition had negative correlation with pupil performance in reading and in mathematics, except in Mozambique, where grade repetition had a positive relationship with pupil performance in reading and mathematics.

In South Africa, all the variables in the pre-existing pupil characteristics construct (10 out of 10) had relationships with pupil performance in reading and in mathematics and were statistically significant. South Africa was followed by Namibia, which had strong correlations in eight out of 10 variables in reading and nine out of 10 in mathematics.

Pupils' age had a negative relationship with pupil performance in reading and in mathematics in all education systems except in Seychelles, where the negative relationship applied only in mathematics. Meals were one of the variables that had a relationship with pupil performance in reading and mathematics in some countries. (For more information, see Appendix 73 and Chapter 6, Tables 6.20 to 6.22 and Figure 6.6.)

Table 9.21 also shows the correlations between the *parents' and community school involvement construct* and pupil performance in reading and in mathematics in SACMEQ countries. As can be seen in Table 9.21, there was a noticeable relationship which is useful for limited prediction between pupil performance and the variables that comprised the parents' and community school involvement construct. Zambia (nine out of nine in reading and seven out of nine in mathematics), South Africa (10 out of 11 in reading and five out 11 in mathematics), Botswana (six out of 11 in reading and seven out 11 in mathematics) and Kenya (six out of 11 in reading and seven out 11 in mathematics) were the school systems that presented a greater relationship between pupil performance in reading and in mathematics and parents' and community school involvement. Across the SACMEQ countries, some variables appear to be more related to pupils' performance than others, being statistically significant in the majority of the countries: *homework-make sure* (seven out of 14 in reading and eight out of 14 in mathematics); *community contribution-material* (seven out of 14 in reading and eight out 14 in mathematics); *school community problems* (eight out of 14 in reading and six out of 11 in mathematics). (For more information, see Appendix 74.)

Table 9.21

Correlations between variables for pre-existing pupils' characteristics and parent school involvement constructs and pupil performance in reading and in mathematics in SACMEQ II tests

Countries	BOT		KEN		LES		MAL		MAU		MOZ		NAM	
Variables	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**
Pre-Existing Pupils' Characteristics														
Pupil's age	.436	357	.578	.492	.291	.266	.206	-	.494	.521	.270	.155	.504	.487
Pupil sex	-	-	-	-	-	-	-	.202	.154	-	.200	-	-	.132
Pupil place to stay	.317	267	-	-	-	-	-	-	-	165	.247	.175	-	-
No books at home	.671	.677	.317	.347	.168	-	.286	.358	.444	.461	-	-	.394	.393
P. morning meal	-	-	.211	.176	-	-	-	-	.218	.233	-	-	.222	.208
Pupils' Lunch	.255	.218	.241	.207	-	-	-	-	-	-	-	-	.269	.258
P. evening meal	.252	.191	.242	.186	-	-	-	-	-	-	-	.225	.150	.133
Pupil's' SES	.685	.560	.691	.564	.366	.283	.428	.292	.558	.590	.368	.216	.798	.747
Grade repetition	.241	.245	.190	-	.279	.188	.217	.356	.539	.556	.259	.179	.523	.530
P. repeating G6	-	-	.379	.311	-	-	-	-	.521	.520	-	-	.322	.312
Parents and community School involvement														
Homework-make	.409	.394	.426	.408	-	-	-	-	-	-	-	-	.293	.284
P' homework-	.361	.242	.312	.267	-	-	-	.167	-	-	-	-	-	-
Looked SW	.348	.338	.377		.214	-	-	-	.184	.166	-	-	-	-
Asked to R/Calc	-	.194	-	.236	-	-	-	-	-	.182	.186	.158	.239	-
Asked Q R/M	-	-	-	.332	-	-	-	-	-	-	264	.185	.262	-
T asking parents	.340	-	.261		-	-	-	-	-	-	-	-	-	-
Community contr	.283	.325	-	-	-	-	.236	.261	-		-	.180	.507	.478
Community contr	-	-	235	.168	-	-	300	.219	.151	.172	-	-	.210	.180
Community contr	-	-	-	-	-	-	-	-	-		-	-	.192	.234
Community contri		184		-			.254	-	.203	.231	-	-	-	-
Comm. Problems	.218	.282	196	.259	-	-	-	-	.309	.333	-	-	-	-

Countries	SEY		SOU		SWA		TAN		UGA		ZAM		ZAN	
Variables	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**R**	**M**
Pre-Existing Pupils' Characteristics														
Pupil's age	183	.315	.523	.442	.501	.354	.323	.264	.445	.323	.549	.415	.152	-
Pupil sex	-	-	.217	.187	-	-	-	-	-	-	.166	-	-	.231
Pupil place to stay	-	.270	.347	.296	-	.211	-	-	-	-	-	-	.303	.224
No books at home	.631	.586	.423	.491	.292	.370	-	-	.203	-	.410	.301	.208	-
P. morning meal	.277	.318	.215	.250	-	.200	.295	.321	.351	.329	.407	.310	.267	.246
Pupils' Lunch	.278	245	.312	.323	-	.160	.343	.305	.268	.229	-	-	-	-
P. evening meal	.375	229	.376	.375	-	211	-	-	.344	.327	-	-	.211	.179
Pupil's' SES	.701	.731	.776	.699	.609	.469	.629	.553	.567	.409	.670	.501	.424	-
Grade repetition	-	-	.675	.646	.401	.335	.235	.177	.196	.259	.328	.282	-	-
P. repeating G6	-	.169	.467	.384	-	.161	-	-	.275	.305	-	-	-	-
Parents and community School involvement														
Homework-make	.172	252	.329	.279	.267	.232	-	.170	-	-	.314	.306	-	-
P' homework-	-	-	.152	-	.264	-	.292	.353	-	-	.308	.242	-	-
Looked SW	.275	-	.239	-	.159	-	.347	.396	175	-	.380	.285	-	-
Asked to R/Calc	-	-	.254	-	-	-	-	.386	-	-	.166	.218	-	-
Asked Q R/M	-	.256	.198	-	-	-	.328	.405	-	.161	.374	297	-	-
T asking parents	.270	.204	.215	-	.275	-	-	-	-	-	.273	-	-	-
Community contr	-	-	.281	.276	-	-	.258	.163	.244	.154	.355	.160	-	.177
Community contr	.247	-		-	-	-	-	-	-	-	.153	-	-	-
Community contr	-		.462	.495	-	-	-	-	.174		.299	.260	-	-
Community contri	.170		.281	.292	-	-	-	-	-		-	-	-	-
Comm. Problems	.410	.439	.201	.244	-	-	-	-	.227	.158	.200	-	.231	-

a)The underlined results had a negative correlation with pupil performance. **Legend:** R= reading; M= mathematics P= pupils; T =teachers; HW =homework; No=number; Q=question; SW=school work; par=parents contr=contribution; comm.=community

□ = p ≤ .05;

□ = r ≤ 0.15

□ = p ≤ .01

□ = Not significant

In the case of Mozambique, the low correlation for the variables may be related to the level of parents' education and the high rate of illiteracy (34.3%), especially among the female population (66.7% - INE. 2008).

From the results above it can be seen that in Mozambique as in most other SACMEQ countries pupil performance is associated more by individual pupil-level differences than with teacher training, teachers' characteristics, the internal and external teaching contexts, parents' involvement, or other variables in the conceptual framework.

For a more detailed analysis, regression analysis is used in the next section to identify the main predictors of pupil performance and the degree of variance that can be explained by the predictors.

9.2 PREDICTING PUPIL PERFORMANCE BY TEACHER COMPETENCE FACTORS IN MOZAMBIQUE AND IN SACMEQ COUNTRIES

This section presents the main predictors of pupil performance in reading and in mathematics in Mozambique and in other SACMEQ countries. As in correlations, the analysis followed the structure of the conceptual framework, which is composed of three domains and six constructs. The Multivariate Regression Model was used to understand to what extent the pupil performance variation is explained by various domains and constructs described in the conceptual framework.

9.2.1 An Overview of Mozambique and SACMEQ Countries as a whole

From correlations in the previous section and taking into consideration all of the variables in the study, it can be observed that there was more noticeable correlation between pupil performance in reading (80) than in mathematics (71). The issue now is to analyse to what extent all of the variables together explain the pupils' performance. As was presented in Chapter 5, Section 5.4.7, the variables which have a correlation coefficient (with an absolute value) equal to or higher than 0.15 with achievement (in reading and mathematics), are included in the Multiple Regression Model (MRM) (stepwise). However, due to the problem of multi-collinearity (see Chapter 5), only a few of them are significant.

Tables 9.22 and 9.23 present an overview of findings of the main predictors of pupil performance in reading and mathematics in Mozambique and in other SACMEQ countries as a whole. In the two tables, the dependent variable is the pupils' reading and mathematics scores and the predictors are variables in the **cognitive, affective, and behavioural domains**, and *the constructs in teacher training, teachers' characteristics, external teaching context and internal teaching context, pre-*

existing pupils' characteristics and *parents and community involvement*. A number of variables were included in separate models firstly for Mozambique and secondly for SACMEQ data. Ultimately, after the application of stepwise, the results revealed that there were seven predictors in reading and eight in mathematics for Mozambique, while SACMEQ had 30 predictors in each subject.

It can be observed in Table 9.22 that the main predictors of pupil performance in Mozambique as a whole were found in the **behavioural domain**, with two predictors in reading and four in mathematics, while in the SACMEQ countries the main predictors of pupil performance were found in the *pre-existing pupils' characteristics* with five predictors in each subject. In Mozambique, the behavioural domain is followed by the *internal teaching context and pre-existing pupils' characteristics*, with two predictors in reading; while in the SACMEQ countries, the pre-existing pupils' characteristics are followed by the **behavioural domain** (nine in total with six in reading and three in mathematics) and *the external teaching context* with eight predictors (three in reading and five in mathematics). The **cognitive domain** in Mozambique and the **affective domain** in SACMEQ countries were not found to be predictors of pupil performance in reading or in mathematics.

Table 9.22

Results of stepwise regression showing main predictors of pupil performance in reading and mathematics in Mozambique and in SACMEQ countries per domain and construct

	Cognitive		**Affective**		**Behaviour**		**Teacher training**		**Teacher Characteristics**		**Ext. Teaching Context**		**Int. Teaching Context**		**Pre-existing Pupils Char.**		**Parent Involvement**	
	Read	**Math**	**Read**	**Math**	**Read**	**Math**	**Read**	**Math**	**Read**	**Math**	**Read**	**Math**	**Read**	**Math**	**Read**	**Math**	**Read**	**Math**
MOZ	-	-	-	1P	2P	4P	1P	-	-	1P	1P	-	1 P	1P	2P	-	-	1 P
SAC	1P	3P	-	-	6P	3P	2P	1P	2P	1P	3P	5P	2P	4P	5P	5P	1P	1P

P=Predictor

Table 9.23

Results of stepwise regression showing main predictor of pupil performance in reading and mathematics across all SACMEQ countries per domain and construct

	Cognitive		**Affective**		**Behaviour**		**Teacher training**		**Teacher Characteristics**		**Ext. Teaching Context**		**Int. Teaching Context**		**Pre-existing Pupils Char.**		**Parent Involvement**		**Adjusted R Square**	
	Read	**Math**	**Read**	**Math**	**Read**	**Math**	**Read**	**Math**	**Read**	**Math**	**Read**	**Math**	**Read**	**Math**	**Read**	**Math**	**Read**	**Math**	**Read**	**Math**
BOT	-	-	-	-	1P	2P	-	2P	-	1P	-	1P	-	-	3P	3P	-	1P	**.785**	**.920**
KEN	-	-	-	1P	2P	1P	-	-	-	-	1P	2P	1P	1P	2P	1P	1P	-	**.609**	**.418**
LES	-	-	-	-	-	1P	-	1P	-	-	1P	1P	1P	-	1P	-	1P	-	**.348**	**.341**
MAL	-		1P	-	-	-	-	1P	-	1P	-	-	-	-	1P	3P	-	1P	**.472**	**.303**
MAU	1P	1P	1P	1P	2P	3P	-	1P	-	-	-	-	1P	-	2P	2P	-	-	**.567**	**.571**
MOZ	**-**	**-**	**-**	**1P**	**2P**	**4P**	**1P**	**-**	**-**	**1P**	**1P**	**-**	**1 P**	**1P**	**2P**	**-**	**-**	**1P**	**.434**	**.320**
NAM	1P	1P	-	1P	1P	1P	5P	5P	1P	-	1P	2P	1P	-	6P	5P	1P	1P	**.811**	**.778**
SEY	-	-	1P	1P	-	1P	-	-	-	-	-	-	-	-	1P	1P	-	-	**.559**	**.840**
SOU	1P	1P	-	-	2P	-	-	1P	-	-	2P	-	1P	1P	2P	3P	-	-	**.752**	**.850**
SWA	-	-	-	-	-	1P	2P	-	-	-	-	-	-	-	3P	3P	-	-	**.701**	**.593**
TAN	-	-	-	-	1P	1P	1P	1P	-	-	-	-	-	1P	1P	2P	-	1P	**.417**	**.803**
UGA	1P	1P	-	-	1P	1P	1P	1P	-	-	1P	-	-	1P	5P	3P	-	1P	**.545**	**.502**
ZAM	-	-	-	1P	-	1P	-	-	1P	-	-	-	2P	1P	2P	1P	1P	-	**.889**	**.479**
ZAN	-	-	1P	-	2P	-	-	-	-	-		-	1P	-	3P	2P	-	-	**.408**	**.235**
SAC	**4**	**4**	**4**	**6**	**14**	**17**	**10**	**13**	**2**	**3**	**7**	**6**	**9**	**6**	**34**	**29**	**4**	**6**	**.529**	**.489**

P=Predictor and number indicates number of predictors found per cell

Table 9.23 presents the results of stepwise regression showing the main predictors of pupil performance in reading and mathematics across all SACMEQ countries per domain and construct.

Table 9.23 shows that for seven of the 14 SACMEQ systems in reading and 10 of the 14 in mathematics, the largest number of predictors was found in the pre-existing pupils' characteristics (34 predictors in reading and 29 in mathematics), followed by the behavioural domain (14 predictors in reading and 17 in mathematics) and teacher training (10 in reading and 13 in mathematics). The smallest number and least commonly found predictor is teacher characteristics (two predictors in reading and three in mathematics).

Examining each domain, it can be observed that the predictors of pupil performance in reading and in mathematics in SACMEQ countries are more strongly related to the pre-existing pupils' characteristics, in the behavioural domain, and the teacher training construct than any other.

The variance that could be explained across SACMEQ countries by the regression models (stepwise) ranged from 34.8% (adjusted R^2) in Lesotho to 88.9% in Zambia in reading, and ranged from 23.5% (adjusted R^2) in Zanzibar to 92% in Botswana in mathematics. A higher percentage of variance was evident for reading (52.9%) than for mathematics (48.9%) in SACMEQ countries generally.

9.2.2 Predicting Pupil Performance in Reading by Teacher Competence Factors in Mozambique and in SACMEQ Countries

The next sections will present and discuss an overview of the main predictors of pupil performance in Mozambique and in other SACMEQ countries.

Predicting pupil performance in reading by teacher competence factors in Mozambique

The following section concentrates on the results of the stepwise regression model[17]. Table 9.24 presents the results of the regression model (stepwise) where the dependent variable was pupil performance in reading tests. When correlated individually, variables with pupil performance are significant, but when the variables are combined in a model, only a few are significant.

In general, most results are consistent with the conceptual framework and are consistent with other cross-national studies. When all of the eight predictors are included (see Table 9.24) 43.4% of variance in reading achievement is explained. The indicators with the significant effect on pupil

[17] The regression model seems not to have multi-collinearity problems because VIP was less than 10.

performance belong to the following domain and constructs: behavioural, teacher training, the external and internal teaching context constructs, and the pre-existing pupils' characteristics construct. As can be seen in Table 9.24, the results suggest that the strongest indicator is *speaking Portuguese at home* ($\beta = .34$; $p = .000$), which belongs to the behavioural domain. The magnitude of the estimated effects is 34% of the standard deviation of (SD)[18]. Taking into consideration that speaking Portuguese at home is a proxy of parent education and therefore of SES in Mozambique, the results reflect the effect of pupils' characteristics on pupil performance. It was surprising to find that in the internal teaching context, the *number of periods of school* had a negative effect on pupil performance (19%), meaning that in one SD in *school head-number of periods*, the pupil performance decreased to almost a fifth of an SD. One can speculate that the amount of time spent by a school head on teaching implies a reduction of time in school management, which may have a negative effect on pupil performance. However, there may also be other contributory factors. Other indicators with strong effects were related to the *short training* and *grade repetition* with a positive association of magnitude of 13% and 17%. This suggests that short-term training had a positive effect on pupil performance as well as *pupils' grade repetition*. *Pupils' absenteeism to work* (19%), *having a teacher without a professional qualification* (19%), *pupils' extra tuition in Portuguese* (15%) and a *pupils' age* (12%) tend to have a negative effect on pupils' performance.

[18] 1 SD increase on frequency of speaking Portuguese at home implies an increased 0,34 on pupils' achievement at school keeping other variables constant.

Table 9.24

Stepwise regression model for reading in Mozambique

Domain	Learning Factors	Unstandardized Coefficients		Standard Coeff.			Collinearity Statistics	
		B	Std Error	Beta	t	Sig.	Tolerance	VIF
Behavioural	(Constant)	32.024	8.032		3.987	.000		
	Speaking Portuguese at home	27.291	4.871	**.346**	5.603	.000	.931	1.074
	Pupils' absent - work	-15.118	4.895	-.193	-3.088	.002	.914	1.094
Teacher Training	No teacher training	-.234	.072	-.197	-3.263	.001	.976	1.025
	Short training	.183	.085	.131	2.155	.033	.962	1.040
Ext. T. Context	Extra tuition in Portuguese	-4.932	2.087	-.151	-2.363	.019	.870	1.150
Int. Teaching Context	School head number of periods	-.143	.047	-.191	-3.013	.003	.887	1.127
P.E.P. Characterist.	Grade repetition	7.585	2.714	.173	2.795	.006	.925	1.081
	Pupils' age	-.062	.031	-.128	-2.032	.044	.895	1.117

a Dependent Variable: ratotp

R Square = 0.462 D.W = 1.647 Adjusted R Square = 0.434 F =16.241 Sig = 0.000 VIF 1.025 – 1.150

Examining the domain and constructs where variables belong, it can be said that the data support the conceptual framework of this study, and that for Mozambique the behavioural domain, the teacher training construct, the external teaching construct, the internal teaching construct and the pre-existing pupils' characteristics construct were the predictors of pupil performance in Mozambique. Educationally these results have to be taken into account by the various Ministries of Education and this aspect is further discussed in the conclusions in Chapter 10. Comparing this with the adapted Cheng and Tsui model, it is evident that the cognitive and affective domains, the teachers' characteristics construct and parent and community involvement construct were not predictors of pupil performance in Mozambique (See Appendix 75).

Predicting pupil performance in reading by teacher competence factors in SACMEQ countries

Table 9.25 shows the results of the regression model (stepwise) in the reading test in SACMEQ countries and explains the variance adj $R^2 = 0.529$ in reading. This variance means that the pupil performance in reading in SACMEQ countries was explained by those factors shown in Table 9.25, which belong to all of the domains and constructs of the adapted Cheng and Tsui model except the affective domain. Of note, is that the indicators with the largest magnitude affect belong to the behavioural domain: pupils' characteristics and the external teaching context construct such as pupils' socio-economic status (27.9%), *pupils' speaking the language of instruction home* (19.4%), total school resources (15.9%), *pupils' repeating a grade* (13.9%), the number of books at home (11.8%), teachers meeting pupils' parents (11.9%), pupils' absent to work (10.6%), and pupils paying for extra tuition (10.3%). Interestingly, and of importance to ministries of education, both the Mozambican and the SACMEQ results highlight the relevance of the *language spoken at home* as a predictor of pupil performance in reading.

Table 9.25

Stepwise regression model in reading in SACMEQ countries

Domain and Constructs	Factors	Unstandardized Coefficients B	Unstandardized Coefficients Std Error	Std Coeff. Beta	t	Sig.	Collinearity Statistics Tolerance	Collinearity Statistics VIF
Domain Cognitive	(Constant)	19.889	5.743		3.463	.001		
	T. with primary education only	-.087	.031	-.058	-2.825	.005	.943	1.061
Behavioural	P. speak lang. of instruction home	8.977	1.027	.194	8.744	.000	.816	1.226
	Pupils' absent - work	-9.125	1.892	-.106	-4.823	.000	.830	1.205
	Pupils' absent	-.409	.178	-.051	-2.305	.021	.814	1.228
	T/pupils' parents meet/year	.049	.009	.120	5.743	.000	.915	1.093
	Teacher reading approach (factor)	.549	.227	.050	2.420	.016	.952	1.050
	S. head experience this school	-.185	.040	-.098	-4.608	.000	.890	1.124
Teacher Training	In-service training	-1.046	.496	-.044	-2.111	.035	.939	1.064
	No teacher training	-.142	.072	-.042	-1.965	.050	.877	1.140
T. Characterist.	Teachers' source of lighting	-.862	.367	-.076	-2.349	.019	.379	2.640
	Teachers' possessions	-.242	.120	-.072	-2.009	.045	.316	3.168
I. T. Context	S. head number of periods	-.065	.020	-.076	-3.226	.001	.719	1.390
	Teach. access to material (factor)	-1.595	.352	-.104	-4.535	.000	.764	1.309
E. T. Context	School location	.947	.324	.074	2.925	.004	.634	1.579
	Total school resources [max=22]	.306	.069	.139	4.411	.000	.405	2.469
	Paying for extra tuitions	-1.984	.458	-.103	-4.329	.000	.714	1.401
Pre-existing Pupils Characteristics	Pupils' socio-economic status	1.114	.179	.279	6.212	.000	.199	5.021
	The number of books at home	.048	.009	.118	5.121	.000	.749	1.334
	Pupils' evening meal	2.943	.730	.087	4.034	.000	.866	1.155
	Age in months	.068	.024	.099	2.778	.006	.313	3.192
	Pupils repeating G6	-10.195	1.602	-.139	-6.364	.000	.841	1.189
P.C. Sch Involv.	S. contributed by com.-textbooks	.857	.241	.080	3.557	.000	.784	1.275

a Dependent Variable: ratotp

R Square = 0.538 D.W = 1.442 Adjusted R Square = 0.529 F = 60.977 Sig = 0.000 VIF 1.050 – 5.021

Although the pupils' characteristics play an important role in overall results in SACMEQ countries, it can be said that the results are consistent with a hypothesis that pupils, teachers and parents' attitudes make a difference to pupil performance.

One important remark to be made is that the results are consistent with the adapted Cheng and Tsui model, with some variation in terms of the magnitude of effects of the various domains. For instance, in SACMEQ countries as well as in Mozambique, the pre-existing pupils' characteristics and behaviour are most important predictors of pupil performance. Other variables to take into consideration in terms of predicting pupil performance in reading in SACMEQ countries were *teachers' possessions* (β = -.072; $p \leq .01$), and *pupils' lack of school material* had a negative impact on pupil performance (β = -.104; $p \leq .001$).

To sum up, all the factors that predict pupil performance related to the teacher training construct, such as *in-service training* (β = -.044; $p \leq .01$) and *no teacher training* (β = -042; $p \leq .05$), in particular, tend to have negative effects on pupils' performance. This finding is another that could inform Ministries of Education in the future revision of pre- and in-service teacher training programmes.

Predicting pupil performance in reading by teacher competence factors in each SACMEQ country

Table 9.26 shows the results of the use of the regression model (stepwise) in the reading test in each SACMEQ country. The regression models (stepwise) explain more than 50% (adj R^2) of variance in reading in all SACMEQ countries, except in Lesotho (34.8%), Malawi (47.2%), Mozambique (43.4%), Tanzania (41.7%), and Zanzibar (40.8%). The explained variation in Zambia is the highest at 88.9%, followed by Namibia with 81.1%, Botswana with 78.5% and South Africa with 75.2%. *Pre-existing pupils' characteristics* seems to be the most important predictor of pupil performance in reading in all 14 of the SACMEQ countries. This construct is followed by the behavioural domain, for which there are firm relationships in nine of the 14 systems of education. *Socio-economic status (SES)*, one of the variables in pre-existing pupils' characteristics, appears as a predictor of pupil performance in reading in 12 of the 14 systems of education, the exceptions being Lesotho and Mozambique.

Table 9.26

Stepwise regression model in reading in each SACMEQ country

Domain	Factors	Unstandardized Coefficients		Standard Coeffic			Collinearity Statistics	
		B	Std Error	Beta	t	Sig.	Tolerance	VIF
BOT	(Constant)	12.245	8.664		1.413	.165		
Pre-existing P. Character.	Pupils' SES	1.284	.359	.408	3.577	.001	.375	2.668
	Number of books at home	.110	.025	.487	4.435	.000	.406	2.463
	Pupils' lunch meal	6.072	2.524	.179	2.405	.021	.880	1.137
R Square = 0.800 D.W = 1.668 Adjusted R Square =0.785 F = 54.546 Sig = 0.000 VIF 1.137 – 2.668								
KEN	**(Constant)**	48.776	5.136		9.498	.000		
Behavioural	Pupils' absent	-1.634	.786	-.203	-2.077	.043	.769	1.300
	P absent-work	-39.506	14.420	-.263	-2.740	.009	.802	1.246
I. T. Context	P' borrow books	5.348	2.141	.231	2.498	.016	.866	1.155
E. T. Context	P-teacher ratio	-.249	.084	-.269	-2.949	.005	.889	1.125
P.E.P.Charact.	P SES	1.113	.437	.263	2.545	.014	.692	1.446
P.C.Sch.Involv	T asked par to sign	5.153	1.871	.255	2.754	.008	.862	1.160
R Square = 0.653 D.W = 1.987 Adjusted R Square =0.609 F = 14.772 Sig = 0.000 VIF 1.125 – 1.446								
LES	**(Constant)**	26.447	2.016		13.120	.000		
Behavioural	Speak lang. of instruction at home	3.061	1.327	.149	2.306	.022	.889	1.125
I. T. Context	Pupils' school material (factor)	1.789	.764	.144	2.342	.020	.979	1.022
E. T. Context	School location	1.697	.639	.181	2.656	.009	.796	1.256
	Total school resources	.892	.194	.312	4.584	.000	.799	1.252
P.E.P.Charact.	Pupils' Grade repetition	-6.688	1.987	-.209	-3.365	.001	.960	1.042
Parent C Inv	Looked at the school work	4.285	1.974	.136	2.171	.031	.941	1.063
R Square = 0.370 D.W = 1.888 Adjusted R Square =0.0.348 F = 16.649 Sig = 0.000 VIF 1.022 – 1.256								
MAL	(Constant)	28.839	2.675		10.782	.000		
Affective	T. satisf-T. house availability	-6.059	2.148	-.333	-2.821	.007	.879	1.138
P. E. P. Cha.	Pupils´SES	.981	.225	.516	4.367	.000	.879	1.138
R Square = 0.497 D.W = 1.737 Adjusted R Square =0.472 F = 20.248 Sig = 0.000 VIF 1.138 – 1.138								

Table 9.26 (Continued)

Domain	Factors	Unstandardized Coefficients B	Std Error	Standard Coeffic Beta	t	Sig.	Collinearity Statistics Tolerance	VIF
MAU	(Constant)	-7.579	8.658		-.875	.383		
Cognitive	Teachers (sec)	.181	.057	.215	3.141	.002	.681	1.468
Affective	T sat.-sch. Man quality	11.024	3.600	.176	3.062	.003	.963	1.039
Behavioural	T. P' parents meet/year	.111	.025	.263	4.436	.000	.908	1.101
	P.' absent	-1.068	.502	-.130	-2.126	.035	.854	1.171
	Pupils' borrow books	3.793	1.495	.147	2.537	.012	.948	1.054
Pre-existing P. Character.	Pupils' SES	2.110	.604	.241	3.493	.001	.667	1.498
	Grade repetition	-16.393	5.855	-.200	-2.800	.006	.625	1.600
	Pupils' morning meal	3.662	1.471	.150	2.490	.014	.881	1.135
R Square = 0.593 D.W = 1.819 Adjusted R Square = 0.567 F = 23.281 Sig = 0.000 VIF 1.054 – 1.600								
MOZ	(Constant)	32.024	8.032		3.987	.000		
Behavioural	Speak lang. instruction at home	27.291	4.871	.346	5.603	.000	.931	1.074
	Reason absent-work	-15.118	4.895	-.193	-3.088	.002	.914	1.094
T. Training	No teacher training	-.234	.072	-.197	-3.263	.001	.976	1.025
	Short training	.183	.085	.131	2.155	.033	.962	1.040
E.T. Context	Extra tuition in Portuguese	-4.932	2.087	-.151	-2.363	.019	.870	1.150
I. T. Context	S. head number of periods	-.143	.047	-.191	-3.013	.003	.887	1.127
P.E.P. Char.	Grade repetition	7.585	2.714	.173	2.795	.006	.925	1.081
	Pupils' age	-.062	.031	-.128	-2.032	.044	.895	1.117
R Square = 0.462 D.W = 1.647 Adjusted R Square =0.434 F = 16.241 Sig = 0.000 VIF 1.025 – 1.150								

Table 9.26 (Continued

Domain	Factors	Unstandardized Coefficients		Standard Coeff			Collinearity Statistics	
		B	Std Error	Beta	t	Sig.	Tolerance	VIF
NAM	(Constant)	-13.309	9.235		-1.441	.151		
Behavioural	Speak lang. instruction at home	6.189	1.605	.123	3.855	.000	.863	1.159
Teacher Training	No teacher training	-.850	.198	-.142	-4.303	.000	.808	1.238
	Short training	-.761	.277	-.084	-2.746	.007	.937	1.067
	Teachers training (2 years)	-.215	.062	-.112	-3.472	.001	.855	1.169
	T. Training more than 3 years	.171	.055	.121	3.098	.002	.583	1.714
	Professional qualification	.939	.346	.087	2.713	.007	.859	1.164
T. Charact.	Source of lighting	-1.233	.438	-.113	-2.818	.005	.546	1.833
I.T. Context	Being given reading homework	-4.043	1.427	-.096	-2.834	.005	.764	1.310
E.T. Context	Total school resources [max=22]	.671	.096	.362	6.960	.000	.328	3.049
Pre-existing P. Charact	Age in months	.178	.044	.179	4.036	.000	.449	2.228
	Pupils' SES	2.036	.248	.512	8.201	.000	.227	4.408
	Grade repetition	-4.778	2.246	-.085	-2.127	.035	.552	1.812
	Pupils' repeating Grade 6	-4.969	2.593	-.066	-1.916	.057	.744	1.345
	Evening meal	3.799	1.169	.122	3.249	.001	.626	1.597
	Pupils' morning meal	-2.251	.887	-.100	-2.537	.012	.571	1.752
Par. Involv.	Asked question about reading	-4.513	2.072	-.073	-2.178	.031	.795	1.257
R Square = 0.825 D.W = 1.646 Adjusted R Square =0.811 F = 58.236 Sig = 0.000 VIF 1.067 – 4.408								
SEY	(Constant)	27.389	10.950		2.501	.027		
Affective	T. satisfaction.-house availability	-5.424	1.283	-.732	-4.228	.001	.979	1.021
P. Charact.	Pupils' SES	2.398	1.013	.410	2.368	.034	.979	1.021
R Square = 0.618 D.W = 2.549 Adjusted R Square =0.559 F = 10.520 Sig = 0.002 VIF 1.021 – 1.021								
SOU	(Constant)	19.503	5.300		3.680	.000		
Cognitive	T. with primary education only	-.284	.065	-.223	-4.379	.000	.924	1.083
Behavioural	Speak lang. instruction at home	10.619	3.863	.158	2.749	.007	.726	1.377
	Reason absent-fee not paid	-16.390	6.664	-.129	-2.460	.016	.872	1.147
E.T.context	Tot. school resources [max=22]	.504	.155	.242	3.258	.002	.434	2.302
	School building condition	-4.122	1.562	-.160	-2.639	.010	.650	1.538
I. T. Context	Total class furniture [max=5]	1.955	.686	.162	2.850	.005	.738	1.356
Pre-existing Pup. Char.	Pupils' SES	.987	.418	.189	2.364	.020	.373	2.683
	Grade repetition	-15.152	3.800	-.254	-3.987	.000	.590	1.694
R Square = 0.771 D.W = 1.900 Adjusted R Square = 0.752 F = 40.327 Sig = 0.000 VIF 1.083 – 2.683								

Table 9.26 (Continued)

Domain	Factors	Unstandardized Coefficients		Standard Coeff			Collinearity Statistics	
		B	Std Error	Beta	t	Sig.	Tolerance	VIF
SWA	(Constant)	60.413	13.454		4.490	.000		
T. Training	1 year	-1.717	.448	-.300	-3.830	.000	.902	1.109
	2 years	-.250	.118	-.173	-2.110	.040	.821	1.218
Pre-existing P. Charact.	Age in months	-.150	.073	-.188	-2.056	.045	.661	1.513
	Number of books at home	.082	.028	.269	2.873	.006	.631	1.585
	Pupils' SES	1.634	.329	.514	4.969	.000	.517	1.933
R Square = 0.729 D.W = 1.895 Adjusted R Square = 0.701 F = 26.318 Sig = 0.000 VIF 1.109 – 1.933								
TAN	(Constant)	44.029	4.358		10.103	.000		
T. Training	Professional qualification	-4.002	1.258	-.412	-3.180	.003	.995	1.005
P.E.P. Charact	Pupils' SES	2.300	.593	.502	3.877	.000	.995	1.005
R Square = 0.450 D.W = 1.986 Adjusted R Square = 0.417 F = 13.497 Sig = 0.000 VIF 1.005 – 1.005								
UGA	(Constant)	11.129	8.637		1.288	.200		
Cognitive	Teacher with tertiary education	-.179	.073	-.148	-2.441	.016	.810	1.235
Behavioural	Speak lang. instruction at home	11.477	2.991	.222	3.837	.000	.887	1.127
T. Training	Short training	-1.661	.673	-.137	-2.468	.015	.965	1.036
E.T.Context	Total school resources	.684	.184	.246	3.725	.000	.681	1.469
Pre-Existing Pupil Characterist.	Pupils' SES	2.347	.411	.391	5.711	.000	.633	1.579
	Pupils' evening meal	5.258	1.559	.197	3.372	.001	.869	1.151
	Pupils' repeating Grade 6	-14.174	3.740	-.232	-3.789	.000	.794	1.259
R Square = 0.566 D.W = 1.833 Adjusted R Square = 0.545 F = 27.207 Sig = 0.000 VIF 1.036 – 1.579								
ZAM	(Constant)	19.696	3.401		5.791	.000		
T. Charact.	Sex	7.494	1.485	.379	5.046	.000	.634	1.577
I.T. Context	Being given reading homework	7.993	2.424	.242	3.298	.003	.664	1.507
	Total class resources	.704	.292	.150	2.410	.024	.923	1.084
Pre E. P. Char	Pupils' socio-economic status	1.158	.323	.311	3.581	.001	.476	2.101
	Grade repetition	-9.297	3.578	-.204	-2.598	.015	.583	1.715
P.C.Sch Involv	Being asked to read	6.974	2.413	.188	2.890	.008	.844	1.185
R Square = 0.910 D.W = 1.866 Adjusted R Square =0.889 F =42.337 Sig = 0.000 VIF 1.185 – 2.101								
ZAN	(Constant)	39.963	3.952		10.113	.000		
Affective	T. Satisf.-house availability	2.426	1.212	.147	2.001	.048	.901	1.110
Behavioural	S. head experience all together	.230	.088	.186	2.602	.010	.953	1.050
	School head lost days	-.141	.067	-.157	-2.091	.039	.864	1.158
I.T. Context	Pupils' school material	-2.362	.930	-.192	-2.540	.012	.846	1.182
Pre-existing P. Charact.	Pupils' socio-economic status	1.151	.236	.358	4.886	.000	.905	1.105
	Pupils' place to stay	-11.854	3.337	-.262	-3.552	.001	.888	1.126
	Pupils' evening meal	1.151	.465	.181	2.477	.015	.906	1.104
R square = 0.442 D.W = 1.791 Adjusted R Square = 0.408 F = 13.025 Sig = 0.000 VIF 1.104 – 1.182								

Other factors to take into consideration as predictors of pupil performance in reading, are *grade repetition* (seven of the 14 systems of education), *pupils' speaking the language of instruction at home* (five of the 14) and *pupils' meals* (five of the 14), especially the *evening meal*, which had a positive effect on pupils' performance in reading. Teachers who had primary education only (South Africa), no teacher training (Mozambique and Namibia), short training (Namibia and Uganda), one year (Swaziland) and two years of training (Namibia and Swaziland) had a negative association with pupil performance in reading.

Examining the model of the conceptual framework, it can be said that the data support the conceptual framework in some ways, but that no single country completely fits the model. However, it can be said that Namibia (seven out of nine), Kenya, Mozambique, South Africa and Uganda (six out of nine) were the countries whose results most closely reflect the model composed of the domains and constructs as represented by Cheng and Tsui. In addition, looking at the SACMEQ countries as a whole, it is evident that the following domains and constructs were not associated with residual pupil performance for the fitted models in reading across SACMEQ countries: the *cognitive domain* in Kenya, Mozambique and Namibia; the *affective domain* in all 5 countries previously mentioned; *teacher training* in Kenya and South Africa; *teachers' characteristics* in Mozambique, South Africa and Uganda; the i*nternal teaching context* in Kenya and Uganda, and *parent and community involvement* in Mozambique, South Africa and Uganda.

In the next section, the regression model (stepwise) identifies the main predictor of pupil performance in mathematics and the amount of variation explained by predictors in Mozambique and in SACMEQ countries as well as in each SACMEQ country. (see Appendix 75)

Predicting pupil performance in mathematics by teacher competence factors in Mozambique and in SACMEQ countries as well as in each SACMEQ country

The next sections present and discuss an overview of the main predictor of pupil performance in Mozambique and in other SACMEQ countries.

Predicting pupil performance in mathematics by teacher competence factors in Mozambique

Table 9.27 shows the results of the regression model (stepwise) in the SACMEQ mathematics test in Mozambique.

Table 9.27

Stepwise regression model for mathematics in Mozambique

Domain	Learning Factors	Unstandardized Coefficients		Standard Coeff.			Collinearity Statistics	
		B	Std Error	Beta	t	Sig.	Tolerance	VIF
	(Constant)	24.193	1.446		16.730	.000		
Behavioural	Pupils' absent - work	-9.505	2.428	-.261	-3.915	.000	.967	1.034
	T. frequency giving written math test	-1.234	.583	-.141	-2.115	.036	.971	1.030
	Teacher frequency meeting parents	1.899	.669	.188	2.837	.005	.981	1.020
	School head activities	.480	.196	.164	2.442	.016	.951	1.052
Affective	T. satisfaction-school building quality	-1.123	.475	-.159	-2.364	.019	.952	1.051
T. Charact.	School head age level	.087	.035	.172	2.526	.013	.934	1.071
I. T. Context	Pupil school material (factor)	-1.245	.408	-.208	-3.051	.003	.929	1.077
Parent C Inv	Asked questions about mathematics	-3.995	1.436	-.186	-2.782	.006	.965	1.036

Dependent Variable: SCR: / pupil math-all total raw score

R Square = 0.354 D.W = 1.738 Adjusted R Square =0.320 F =10.292 Sig = 0.000 VIF =1.020 - 1.077

In Mozambique, all eight predictor variables were included and these variables explained 32% (adjusted R^2) of the total variance of pupil performance in mathematics. In some ways, the constructs, which explain the pupil performance, were the same as in reading. That would be explained by the correlation between reading and mathematics achievement. For instance, the indicators with a significant effect on pupil performance belong to the following domains and constructs: behavioural, affective domains, teachers' characteristics, internal teaching context, and parents' involvement. It is important to note also that the indicators are slightly different. While in reading the indicators in the behavioural domain were more related to the pupils' attitudes (pupils speaking Portuguese at home, and pupils' *absent-work),* in mathematics the indicators were more closely related to the teachers' attitudes (teachers' frequency in giving written mathematics tests, teachers' frequency in meeting parents, the school head's activities). However, in the behavioural domain, the common indicator is *pupils' absenteeism* from (work) school.

As shown in Table 9.27, the strongest predictor of pupil performance in mathematics in Mozambique was *pupils' absenteeism to work* (β = -.261; $p \leq .001$). The magnitude of the estimated effects was 26% of the standard deviation. This effect means that where pupils were absent from school, they tended to achieve lower results in mathematics. The next strongest predictor of pupils' performance was *pupils' possession of school material* (exercise books, a pen, a pencil, etc), which suggests that pupils' lack of school material (β = -.208; $p \leq .01$) had a negative effect on pupil performance. These results highlight the fact that teachers, pupils and parents' attitudes were the predictor of pupils' performance in both subjects. Another indicator with strong effects on pupil performance in mathematics was t*eacher satisfaction (teachers' satisfaction-school building quality* (β = -.159; p $\leq$ .01). As a result, pupils with teachers who were satisfied with the environment in which they worked tended to achieve better results in mathematics.

Parental involvement with their children's mathematics needs and the frequency of assessment must be taken into account as predictors of pupil performance. Parents who *never asked* or *asked only sometimes about mathematics* realised a β = -.186; p $\leq$ .01, while the *frequency with which teachers gave written mathematics tests* realised a β = -.141; p $\leq$ .01 and had a negative effect on pupil performance. Other predictors to take into consideration in terms of predicting pupil performance in mathematics in Mozambique were the *frequency with which teachers met parents* (β = .188; p $\leq$ .01), the *age of the school head* (β = .172; p $\leq$ .01) and the *activities of the school head (*β = .164; p $\leq$ .01*)*, which had a positive effect on pupil performance. Comparing the adapted Cheng and Tsui model with the results, it is evident that the cognitive domain, teacher training, the external teaching context and pre-existing pupil characteristics were not associated with pupil performance in Mozambique.

Predicting pupil performance in mathematics by teacher competence factors in SACMEQ countries

Table 9.28 shows the results of the regression model (stepwise) in the mathematics test in SACMEQ countries.

Table 9.28

Stepwise regression model in mathematics in SACMEQ countries

Domain	Learning Factors	Unstandardized Coefficients B	Std Error	Std Coeff. Beta	t	Sig.	Collinearity Statistics Tolerance	VIF
	(Constant)	4.493	2.976		1.510	.131		
Cognitive	T. with primary education only	-.047	.018	-.046	-2.642	.008	.877	1.141
	T. with secondary education	-.019	.010	-.036	-1.970	.049	.801	1.249
	Teachers' qualification-academic	.441	.130	.060	3.394	.001	.859	1.164
Behavioural	P. speak lang. of instruction home	4.481	.519	.159	8.639	.000	.795	1.258
	Reason absent-work	-5.600	1.014	-.098	-5.526	.000	.861	1.162
	S/ shead experience this school	-.165	.021	-.136	-7.842	.000	.898	1.113
T. Training	More than 3 years of training	.054	.025	.039	2.124	.034	.801	1.248
T. Character.	Teachers' source of lighting	-.966	.174	-.132	-5.553	.000	.478	2.094
Internal Teaching Context	Pupils' school material (factor)	-1.113	.190	-.107	-5.845	.000	.800	1.250
	Sharing/owning math textbooks	1.199	.348	.068	3.450	.001	.704	1.420
	Homework given	2.472	.399	.113	6.190	.000	.806	1.241
	S. head number of periods	-.039	.010	-.073	-3.787	.000	.726	1.378
External Teaching Context	Paying for extra tuitions	-1.841	.247	-.145	-7.449	.000	.716	1.397
	Extra tuition- others subjects	2.634	.463	.108	5.689	.000	.747	1.339
	School location	.415	.180	.049	2.305	.021	.604	1.655
	School building condition	-1.063	.245	-.077	-4.345	.000	.870	1.150
	Total school resources	.087	.039	.060	2.233	.026	.375	2.666
Pre-existing Pupils' Characteristics	Pupils' socio-economic status	.398	.094	.150	4.220	.000	.215	4.660
	Age in months	.036	.013	.080	2.781	.005	.327	3.062
	Pupils' Grade repetition	-3.021	.510	-.111	-5.922	.000	.766	1.306
	The number of books at home	.032	.005	.118	6.377	.000	.785	1.274
	Pupils' evening meal	2.402	.393	.107	6.114	.000	.882	1.134
P Com Sch Inv.	S. cont. com-furnit. equip.(factor)	.428	.127	.061	3.382	.001	.821	1.217

Dependent Variable: SCR:/ pupil mathematics-all total raw score

R Square = 0.495 D.W = 1.400 Adjusted R Square = 0.489 F = 79.831 Sig = 0.000 VIF 1.113 – 4.660

Table 9.28 indicates that the regression model (stepwise) explains that there was more than 48.9% (adj R^2) of the variation in pupil performance in mathematics in SACMEQ countries. This means that a proportion of pupil performance in mathematics in SACMEQ countries is explained by those factors presented in Table 9.28. All of the domains and constructs present in the adapted Cheng and Tsui model are present here except for the affective domain, which is not a predictor association of pupil performance in mathematics.

As in reading, most of the indicators with the greatest magnitude effect belong to the pre-existing pupils' characteristics construct. Variables with a negative association include *pupils' socio-economic status* (15%), grade repetition (11.1%), the *number of books at home* (11.8%) - and to behavioural domain, with *pupils' speaking the language of instruction at home* (15.9%), and the *school head's experience* in the particular school (13.6%). Other predictors to take into consideration in SACMEQ countries were related to the *external teaching context construct*, *paying for extra tuition* (14.5%) and *extra tuition in other subjects* (10.8%) - and in the internal teaching context construct, *the homework given* (11.3%) and pupils' *school material* (10.7%).

One factor which predicted pupil performance strongly was *pupils' speaking the language of instruction at home* (β = .159; p $\leq$ .001). Pupils who frequently speak the language of instruction at home tended to achieve better performance in mathematics. This result confirms what was observed in the correlation at the beginning of this chapter, in which pupil performance in reading correlated strongly with pupil performance in mathematics, a finding from the TIMSS study (see Chapter 3). However, there are other factors to take into consideration in terms of predicting pupil performance in mathematics in SACMEQ countries, and these are *teacher training* (more than 3 years) (β = .039; p $\leq$ .01), *a teacher's academic qualification* (β = 0.060; p $\leq$ 01), *a pupil's evening meal* (β = .107; p $\leq$ .001), and the *community contribution* (β = .061; p $\leq$ .01), all of which correlate positively.

Comparing the results with the adapted Cheng and Tsui model, it can be seen that the affective domain was not a predictor of pupil performance in mathematics in SACMEQ countries. Appendix 71 in the Appendices presents the regression model (enter) in the mathematics test in SACMEQ countries. The next section describes the use of the regression model (stepwise) to identify the main predictor of pupil performance in reading and the amount of variation explained by predictors in each SACMEQ country.

Predicting pupil performance in mathematics by teacher competence factors in each SACMEQ country

Table 9.29 below shows the main predictor of pupil performance in mathematics and the amount of variation explained by predictors in each SACMEQ country. It indicates that in the majority of the school systems (eight out of 14), the regression model (stepwise) explains more than 50% (adjusted R^2) of the variance in mathematics in SACMEQ countries, but not in Kenya (41.8%), Lesotho (34.1%), Malawi (30.3%), Mozambique (32%), Zambia (47.9%) and Zanzibar (23.5%). The largest variance explained was in Botswana (92%), followed by South Africa (85%). The percentage of the variance is lower in mathematics than in reading in eight of the 14 systems of education. Botswana, Mauritius, Seychelles, South Africa and Tanzania were the countries where the variance explained was lower in reading than in mathematics. As in reading, *pre-existing pupils' characteristics* was the strongest predictor of pupil performance in mathematics in all SACMEQ countries except in Mozambique and Zanzibar. Pre-existing pupils' characteristics was followed by the behavioural domain in 11 out of 14, and then by the teachers' training construct in eight out of the 14 systems of education. In pre-existing pupils' characteristics, *SES* appears as a predictor of pupil performance in seven of the 14 systems of education.

Table 9.29

Stepwise regression model in mathematics in each SACMEQ country

Domain	Factors	Unstandardized Coefficients B	Unstandardized Coefficients Std Error	Standard Coeffic Beta	t	Sig.	Collinearity Statistics Tolerance	Collinearity Statistics VIF
BOT	(Constant)	22.857	4.573		4.998	.000		
Behavioural	Speak lang. instruct. at home	5.728	2.035	.162	2.815	.008	.469	2.131
	Teacher math activities	-.819	.289	-.128	-2.836	.007	.771	1.297
T. training	No teacher training	-.586	.190	-.146	-3.079	.004	.699	1.431
	School head special training	2.604	.571	.219	4.563	.000	.678	1.476
T. Characterist.	Teacher age	-.146	.044	-.145	-3.280	.002	.797	1.255
Ext. T. Context	School building condition	-2.173	.539	-.185	-4.034	.000	.745	1.342
Pre E. Pupils	Pupils' evening meal	2.145	.943	.110	2.274	.028	.672	1.488
Character.	Pupils' place to stay	-4.745	1.271	-.192	-3.733	.001	.590	1.696
	Number of books at home	.115	.008	.789	13.680	.000	.470	2.130
P.C. Sch Inv	Homework make sure	-9.677	1.609	-.400	-6.015	.000	.353	2.833
R Square = 0.938 D.W = 1.994 Adjusted R Square =0.920 F =54.594 Sig = 0.000 VIF 1.166 – 2.833								
KEN	(Constant)	24.573	2.120		11.589	.000		
Affective	T. sat.-class furniture quality	1.978	.788	.150	2.511	.013	.966	1.036
Int. T. Context	Pupils' teacher ratio	-.126	.036	-.212	-3.464	.001	.927	1.078
	Homework given	3.472	1.196	.176	2.904	.004	.942	1.062
Ext. T. Context	School building condition	-1.940	.754	-.161	-2.574	.011	.884	1.131
P. E.P. Char	Socio-economic status	1.098	.177	.407	6.186	.000	.800	1.249
R Square = 0.435 D.W = 1.957 Adjusted R Square =0.418 F =25.104 Sig = 0.000 VIF 1.036 – 1.249								
LES	(Constant)	15.870	.986		16.098	.000		
Behavioural	Factor teacher approach	.969	.295	.282	3.288	.001	.997	1.003
	Speak lang. instruct. at home	3.259	1.014	.285	3.214	.002	.934	1.071
T. Training	In-service training	-1.538	.613	-.215	-2.510	.014	.999	1.001
Ext. T. Cont.	School location	1.397	.378	.327	3.696	.000	.933	1.072
R Square = 0.370 D.W = 1.978 Adjusted R Square =0.341 F =12.627 Sig = 0.000 VIF 1.003 – 1.072								
MAL	(Constant)	18.294	.834		21.938	.000		
T. Training	1 years	.035	.018	.165	1.956	.053	.774	1.292
T. Charact.	Teachers' source of lighting	.566	.266	.175	2.130	.035	.819	1.221
Pre-existing	Pupils' sex	-2.894	1.047	-.215	-2.765	.007	.917	1.091
Pupils'	Number of books at home	.051	.014	.278	3.539	.001	.898	1.114
Character.	Grade repetition	-1.691	.696	-.189	-2.428	.017	.917	1.090
Parent C. Inv.	Community contrib. (factor)	.475	.168	.216	2.838	.005	.958	1.043
R Square = 0.336 D.W = 1.910 Adjusted R Square =0.303 F =10.114 Sig = 0.000 VIF 1.043 – 1.292								

Table 9.29 (Continued)

Domain	Factors	Unstandardized Coefficients		Standard Coeffic			Collinearity Statistics	
		B	Std Error	Beta	t	Sig.	Tolerance	VIF
MAU	(Constant)	1.991	4.963		.401	.689		
Cognitive	Teacher with secondary educ.	.111	.040	.188	2.807	.006	.706	1.416
Affective	T. sat .sch. managem. quality	9.380	2.566	.212	3.656	.000	.938	1.066
Behavioural	Teacher hours outside	.201	.057	.202	3.543	.001	.970	1.031
	Speak lang. instruct. at home	2.659	1.279	.126	2.079	.040	.855	1.169
T. Training	More than 3 years of training	.124	.055	.128	2.229	.028	.959	1.042
Pre-existing	Pupils' socio-economic status	1.671	.418	.270	4.001	.000	.691	1.447
P. Charact.	Grade repetition	-19.133	3.784	-.330	-5.057	.000	.741	1.350
R Square = 0.593 D.W = 1.852 Adjusted R Square =0.571 F =26.868 Sig = 0.000 VIF 1.042 – 1.447								
MOZ	(Constant)	24.193	1.446		16.730	.000		
Affective	T. satisf-sch building quality	-1.123	.475	-.159	-2.364	.019	.952	1.051
Behavioural	Reason absent-work	-9.505	2.428	-.261	-3.915	.000	.967	1.034
	T. frequency meeting parents	1.899	.669	.188	2.837	.005	.981	1.020
	School head activities	.480	.196	.164	2.442	.016	.951	1.052
	T. freq.giving written test	-1.234	.583	-.141	-2.115	.036	.971	1.030
Int. T. Context	Pupil sch. material (factor)	-1.245	.408	-.208	-3.051	.003	.929	1.077
T. Character.	School head age level	.087	.035	.172	2.526	.013	.934	1.071
Parent C. Inv.	Asked questions about math.	-3.995	1.436	-.186	-2.782	.006	.965	1.036
R Square = 0.354 D.W = 1.738 Adjusted R Square =0.320 F =10.292 Sig = 0.000 VIF =1.020 - 1.077								
NAM	(Constant)	1.533	5.241		.293	.770		
Cognitive	T. academic qualification	.488	.192	.089	2.547	.012	.833	1.201
Behavioral	T mact	-.796	.230	-.126	-3.465	.001	.771	1.298
Teacher Training	Teacher training (no training)	-.350	.125	-.098	-2.804	.006	.835	1.198
	Short training	-.507	.177	-.094	-2.859	.005	.948	1.055
	T. Training 2 years	-.161	.045	-.140	-3.594	.000	.678	1.475
	More than 3 years of training	.199	.037	.235	5.426	.000	.548	1.826
E. T. Context	Total school resources	.346	.061	.312	5.639	.000	.334	2.990
I. T. Context	Number of classes – grade 6	-.550	.208	-.110	-2.640	.009	.595	1.680
Pre-existing Pupils' Charact.	Pupils' age in months	.083	.027	.143	3.059	.003	.472	2.120
	Pupils' socio-economic status	.712	.148	.300	4.801	.000	.263	3.806
	Number of books at home	.045	.012	.142	3.865	.000	.762	1.313
	Pupils' repeating Grade 6	-3.640	1.653	-.081	-2.202	.029	.754	1.326
	Grade repetition	-2.946	1.404	-.090	-2.099	.037	.564	1.772
R Square = 0.792 D.W = 1.681 Adjusted R Square =0.778 F =59.308 Sig = 0.000 VIF 1.055 – 3.806								

Table 9.29 (Continued)

Domain	Factors	Unstandardized Coefficients		Standard Coeffic			Collinearity Statistics	
		B	Std Error	Beta	t	Sig.	Tolerance	VIF
SEY	(Constant)	-15.380	5.435		-2.830	.011		
Affective	T. satisf-sch building quality	3.651	.986	.330	3.704	.002	.879	1.137
Behavioural	Pupils' absent	3.273	.867	.354	3.776	.001	.792	1.262
Int.T. Context	School head periods	.165	.058	.243	2.843	.010	.952	1.050
P.E.P.Char	Socio-economic status	3.487	.496	.664	7.030	.000	.780	1.281
R Square = 0.868 D.W = 1.930 Adjusted R Square =0.840 F =31.136 Sig = 0.000 VIF 1.050 – 1.281								
SOU	(Constant)	24.696	6.666		3.705	.001		
Cognitive	T. academic qualification	2.350	.596	.341	3.945	.000	.588	1.701
T. Training	Professional qualification	-3.447	1.337	-.265	-2.579	.015	.417	2.396
I.T.Context	Number of books at home	.062	.022	.212	2.865	.008	.801	1.248
	Class size	-.277	.074	-.259	-3.760	.001	.931	1.074
	Socio-economic status	1.853	.406	.492	4.561	.000	.378	2.647
	Grade repetition	-12.762	4.551	-.291	-2.804	.009	.408	2.454
R Square = 0.877 D.W = 2.132 Adjusted R Square =0.850 F =33.184 Sig = 0.000 VIF 1.074 – 2.647								
SWA	(Constant)	-1.670	8.200		-.204	.839		
Behavioural	Pupils' absent	-2.020	.704	-.242	-2.868	.006	.988	1.012
P.E. Pupils' Characterist.	Pupils' socio-economic status	.948	.177	.486	5.354	.000	.853	1.172
	Pupils' evening meal	5.399	2.153	.216	2.507	.015	.942	1.062
	Number of books at home	.069	.018	.339	3.730	.000	.851	1.175
R Square = 0.621 D.W = 1.797 Adjusted R Square =0.593 F =22.116 Sig = 0.000 VIF 1.012 – 1.175								
TAN	(Constant)	6.572	3.143		2.091	.043		
Behavioral	Pupils' absent	-.954	.182	-.367	-5.240	.000	.856	1.168
	Teachers' experience	.103	.049	.149	2.093	.043	.831	1.204
T.Training	1 year	-.152	.068	-.152	-2.250	.030	.916	1.092
I.T. Context	Pupils' sitting place	10.483	4.737	.236	2.213	.033	.370	2.704
Pre-existing P. Characteristics	Pupils' lunch meal	2.314	1.106	.223	2.092	.043	.370	2.702
	Grade repetition	-5.584	1.374	-.291	-4.065	.000	.819	1.221
Parent/comm. I.	Asked quest about mathematics	7.695	1.405	.386	5.477	.000	.844	1.185
R Square = 0.832 D.W = 1.839 Adjusted R Square =0.803 F =28.374 Sig = 0.000 VIF 1.092 – 2.704								

Table 9.29 (Continued)

Domain	Factors	Unstandardized Coefficients		Standard Coeffic			Collinearity Statistics	
		B	Std Error	Beta	t	Sig.	Tolerance	VIF
UGA	(Constant)	11.217	6.773		1.656	.101		
Behavioural	T. math. activities (factor)	-3.603	.638	-.420	-5.647	.000	.857	1.167
T. Training	Short training	-2.898	.985	-.212	-2.943	.004	.916	1.092
I.T. Context	Math homework given	6.890	2.373	.223	2.903	.005	.803	1.245
P.E. Pupils' Characterist.	Pupils' socio-economic status	1.209	.382	.245	3.168	.002	.791	1.265
	Grade repetition	-12.890	3.274	-.294	-3.937	.000	.854	1.171
	Pupils' evening meal	3.727	1.640	.164	2.273	.025	.915	1.093
Parent C Inv.	Asked quest about mathematics	-7.366	3.413	-.164	-2.158	.033	.817	1.224
R Square = 0.535 D.W = 1.718 Adjusted R Square =0.502 F =16.105 Sig = 0.000 VIF 1.092 – 1.265								
ZAM	(Constant)	-15.380	5.435		-2.830	.011		
Affective	T. satisf-sch building quality	3.651	.986	.330	3.704	.002	.879	1.137
Behavioural	Pupils' days absent	3.273	.867	.354	3.776	.001	.792	1.262
T. Character	School head periods	.165	.058	.243	2.843	.010	.952	1.050
P.E. P. Char.	Pupils' socio-economic status	3.487	.496	.664	7.030	.000	.780	1.281
R Square = 0.512 D.W = 2.151 Adjusted R Square =0.479 F =15.317 Sig = 0.000 VIF 1.050 – 1.281								
ZAN	(Constant)	12.458	4.085		3.050	.003		
Cognitive	Teacher with primary educ. Only	.136	.043	.281	3.178	.002	.962	1.040
	Teacher academic qualification	1.846	.821	.202	2.250	.027	.932	1.073
E. T. Context	Total school resources	.238	.115	.188	2.069	.041	.913	1.095
Pre E. Pupils' Characterist	Pupils' sex	-7.276	3.405	-.190	-2.137	.035	.952	1.050
	Pupils' morning meal	1.599	.664	.211	2.409	.018	.977	1.023
R Square = 0.273 D.W = 1.568 Adjusted R Square =0.235 F =7.276 Sig = 0.000 VIF 1.023 – 1.095								

Other factors to take into consideration as predictors of pupil performance in mathematics are *pupils' meals* (with a positive effect in five of the 14 systems of education), and *pupils' absences* (five out of 14) and *grade repetition* (six out of 14) with a negative effect association on pupils' performance in mathematics. *Professional training* had a positive effect on pupils' performance in mathematics in four countries, including Malawi (for teachers with more than three years of professional training) and Namibia (two years), and where a teacher had no professional training this absence had a negative impact on pupil performance in mathematics. *Teachers' academic qualification* was a predictor particular association with pupil performance in mathematics in Namibia.

Using the adapted Cheng and Tsui model, it can be said that Botswana and Namibia (six out of 9) and Mauritius, Mozambique, Tanzania and Uganda (five out of nine) were the countries that presented the most domains and constructs with MRM analysis. It is evident that some domains and constructs were not further associated with of pupil performance in the first two countries where the MRM was specified: the cognitive domain, the affective domain and the internal teaching context construct were not predictors in Botswana, while in Namibia, the affective domain, teachers' characteristics and the internal teaching context were not predictors of pupil performance in mathematics (see Appendix 75).

9.3 SUMMARY

In Mozambique, there is a weak correlation between pupil performance and the variables at different domains and constructs with only a few variables having strong associations with pupil performance in reading and in mathematics. Mozambican pupils' characteristics presented as the best predictor of pupil performance.

Examining the results across the provinces, the behavioural domain seems to be the one domain with some correlation in reading and mathematics, although it was weak. The behavioural domain is followed by pre-existing pupils' characteristics. This finding suggest that the teachers', parents' and pupils' attitudes and pupils' characteristics such as SES, home condition, meals, etc. have a positive association with pupil performance. In Mozambique, another construct to take into consideration in pupil performance is the external teaching context, which includes factors such as school buildings and school resources.

The purpose of this chapter was to present the results regarding pupil performance in Mozambique and other SACMEQ countries. The Multivariate Regression Model (MRM) was used to understand to what extent the pupil performance variation is explained by various domains described in the conceptual framework. The analysis therefore started with exploratory statistics such as bivariate correlation between pupil performance and each variable in domain and constructs of the conceptual framework.

The analysis followed the structure of the conceptual framework (see Chapter 5, Figure 5.1) which is organized into three domains, namely the cognitive, affective and behavioural; and on three levels: provincial, national and regional. The conceptual framework is also composed of constructs: teacher training, teacher characteristics, external teacher context, internal teaching context, pupils' characteristics, and parent and community involvement.

For the analysis in the first stage, the data was weighted and aggregated by school, and then PCA was used to develop proxy variables (see Appendices 3 and 4) for the domains in which there are not indices on the database. In the second stage, the analysis starts with basic statistics (correlations) for pupil performance and the background variables. Finally, in the third stage, the regression model was developed using the multivariate regression equation to determine to what extent the empirical evidence supports the conceptual framework. In all three stages, the analysis starts with the Mozambican results and is followed by comparisons between Mozambique and other SACMEQ countries.

The MRM confirms what was found in the correlations. The main predictor of pupil performance in reading and in mathematics in Mozambique is the behavioural domain, while in the SACMEQ countries as a whole, the main predictor is pre-existing pupils' characteristics, which is followed by the behavioural domain and the external teaching context. The correlations show that teacher training has a weak association with pupil performance in Mozambique as well as in the other SACMEQ countries. Various reasons can be given, but the first reason, which may be applicable to some SACMEQ countries, is the absence of variation in teacher training among primary school teachers as most teachers received the same level of teacher training. Of note, is that in Mozambique as a whole, the cognitive domain and professional training are not predictors of pupil performance.

In the case of Mozambique, the second reason, which can be identified as leading to unsatisfactory pupil performance, is the low quality of teacher training. Primary school teaching has been not an attractive profession in Mozambique since 1975, for which reason academically excellent pupils are not recruited into the profession when they leave secondary school. The third reason is the fact that in the last 30 years teacher training has always been an emergency topic, and to date there is no a clear policy for teacher training could be a reason for poor performance and teacher competency.

The data are consistent with the model for SACMEQ countries as a whole. However, when one examining them country by country the picture changes. In countries such as Lesotho, Malawi and Zanzibar, the data are not consistent with the model, only one or two of the nine domains having correlations with pupil performance at the level of .15. In the other countries, the data are consistent with the model in at least seven of the nine domains and constructs, which had correlations with pupil performance.

Using the adapted Cheng and Tsui model it can be said that Namibia (7 out 9), Kenya, Mozambique, South Africa and Uganda (6 out of 9) were the countries that presented more domains and constructs in reading. In mathematics, it can be said that Botswana and Namibia (6 out of 9 and 5 out of 9), Mauritius. Mozambique, Tanzania and Uganda were the countries that presented the most domains and constructs. It must, therefore, be stated that the data support the conceptual framework in some ways, but that no single country completely fits the model.

CHAPTER 10

CONCLUSIONS AND RECOMMENDATIONS

This chapter presents and discusses the conclusions of the study related to teacher competence and its effect on pupil performance in upper primary schools in Mozambique and other SACMEQ countries. Firstly, Section 10.1 gives an overview of the context of the study, which is followed by a summary of the research questions and the findings, while in Section 10.2 reflections on the methodology and substance of the study are presented. Section 10.3 presents the conclusions and recommendations relating to the main factors influencing pupil performance in Mozambique and in other SACMEQ countries in upper primary schools, with recommendations for further research appearing in Section 10.4.

10.1 CONTEXT, SUMMARY OF RESEARCH QUESTIONS AND FINDINGS

This section provides a summary of the context in which SACMEQ II was implemented in Mozambique as well as the main research questions that guided the study. The section reflects the main findings of the effects of teacher competence on pupil performance in reading and in mathematics in Mozambique and in the other SACMEQ countries.

The Southern and Eastern Africa Consortium for Monitoring Educational Quality (SACMEQ) conducts cross-national studies whose purpose is to monitor educational quality in the SACMEQ countries, namely Botswana, Kenya, Lesotho, Malawi, Mauritius, Mozambique (since 1996), Namibia, Seychelles, South Africa, Swaziland, Tanzania (Mainland), Tanzania (Zanzibar), Uganda, Zambia, and Zimbabwe. The International Institute for Educational Planning (IIEP) became a member of SACMEQ in 1997.

SACMEQ II is one of the few known research projects that has carried out a cross-national study in Mozambique using a truly representative sample. Generally, the studies carried out in the field of education in Mozambique are restricted in scope and do not employ a truly representative national sample in their design (Passos, Nahara, Magaia and Lauchande, 2005). Consequently, SACMEQ II provided not only the opportunity for local team members to participate in a large-scale research project, but also provided valid and reliable data on which important decisions could be based. Specifically, SACMEQ II provided relevant, high-quality data about the academic profile of teachers, the level of performance in the areas assessed, school management and other factors that are relevant for policy making for the Ministry of Education and Culture.

Many benefits arising from the SACMEQ study are apparent for Mozambique as well as within the educational context of the region more generally. As a Portuguese-speaking country, Mozambique has a unique history, tradition and system of education that differs from those of the other participating countries. The data collected through SACMEQ II can be considered to be of extreme importance for Mozambique's education system, since it provides the country with important data to motivate reflection on its primary education sector, identify the position of the education system within the region, and consequently, work towards its improvement.

The Republic of Mozambique is located in the south-eastern part of Africa, is divided into 11 provinces and has an overall population of 20 530 714 inhabitants (INE, 2008)**.** The gross illiteracy rate is 34.3%, with the overall illiteracy rate amongst the female population being 66.7% (INE, 2006).

Mozambique was a Portuguese colony from the fifteenth century until political independence from Portuguese rule was attained in 1975. Mozambique is a multilingual country with 18 main Bantu languages (Sitoe and Ngunga, 2000) but Portuguese is the official language and language of instruction from Grade 1. In 2004 the Ministry of Education and Culture (MEC) introduced the mother tongue as the medium of instruction, but this mother-tongue instruction was initially introduced only in Grades 1 and 2 in some schools located in linguistically homogeneous zones.

The National System of Education (SNE) was introduced in 1983. The three main objectives of the education system proposed by the Strategic Plan for Education (1998) are: to increase access and educational opportunities for all Mozambicans at all levels of the education system, to maintain and improve the quality of education, and to develop an institutional and financial framework that would sustain Mozambican schools and pupils in future.

The MEC recognises that the quality of education and teacher training provided in institutions is often poor: "Teachers at all levels are often under qualified for the posts they hold. Nearly a quarter of all teachers in EP1 are entirely untrained, and the majority has received only six years of schooling and one year of professional training" (1998, p.9). For these reasons the MEC defined expanding access to education, improving educational quality and sustaining expansion and improvement as priority activities, and has attempted including teacher training in particular, as part of the programme to ensure on-going improvement of teacher quality. However, in the last 30 years, teacher training has always been considered an emergency topic, but to date there is no clear policy for teacher training (see Chapter 2, Table 2.4).

This then is the context of this study where, for the first time, national and regional samples are used to analyse the relationship between teacher competence and pupil performance in Mozambique and in other SACMEQ countries. The next section presents a summary of the main research questions and results.

10.1.1 Summary of Research Questions and Results

The purpose of this study has been to investigate the effect of teacher competence on pupil performance in upper primary schools in Mozambique and in other SACMEQ countries.

The variables that comprise teacher competence in this study are academic education, professional training and teacher performance in reading and mathematics, as evaluated in the SACMEQ II tests. Those variables can be found in the cognitive and behavioural domains as seen in the teacher training construct in the conceptual framework (see Figure 10.1). As Medley and Shannon say (1994), "Competence to teach is defined in terms of possession of two kinds of knowledge, knowledge of subject matter and professional knowledge." Shulman (1986) reinforces this idea by stating that all three types of knowledge: content knowledge, pedagogical content knowledge, and curricular knowledge, are vital in the training of teachers.

The analysis of the data is dived into two phases. Phase 1 is the descriptive component of the research and was addressed in Chapters 6 and 7, while Phase 2 is an exploratory analysis, which was addressed in Chapter 8. The purpose of Phase 1 is to describe the results of SACMEQ and the characteristics of the sample in Mozambique and other countries in terms of context of the study. Secondly, Phase 1 assisted in identifying variables to include in the analysis of performance for the main questions in the second phase. The purpose of Phase 2 is to establish the relationship between teacher competence and its relationship with pupil performance in reading and in mathematics in Mozambique and in other SACMEQ countries.

The next section presents a summary of the main results of the first phase, providing a descriptive analysis of the characteristics of the teachers, pupils and school conditions in Mozambique and in the other SACMEQ countries.

a) What were the characteristics of the schools that took part in the SACMEQ study? (This aspect is related to pupils' characteristics and the external teaching context).

In Mozambique in 2000, 74.5% of the Grade 6 pupils were found in urban schools. Cabo Delgado was the only province where most of the pupils were found in rural schools (see Chapter 6, Table 6.19). In the SACMEQ countries as a whole, most Grade 6 pupils were found in schools located in rural areas (55%). In some countries, there is a balanced distribution of the location of schools offering Grade 6 in rural and urban areas (see Chapter 6, Table 6.23).

The school resources mean in Mozambique was 6.9 (out of 22). Maputo Cidade had the highest mean (10.7) of school resources (see Chapter 7, Table 7.6). Mozambique mean is compared with 8.2 in the SACMEQ countries on the whole, with Seychelles having the highest mean at 16.7 (see Chapter 7, Figure 7.7).

Mozambican school heads considered all of the activities in the list given to them as very important, but discussing educational objectives with the *teaching staff* was the most important for them (94.2%). About two thirds (69.2%) of principals considered their own *professional development* to be vitally important in running their schools - see Chapter 7, Table 7.9). In the SACMEQ countries as a whole, all of the listed activities (see Chapter 7, Table 7.12) were considered important, but the *professional development* of school directors (95.3%) was thought to be the most important, and contact with the community (83.8%) was ranked as being relatively of the least importance. It seems that in some countries the school directors were more interested in their own professional development than in monitoring pupil progress or their teachers' professional development.

b) What were the characteristics of the classroom? (This question is related to the internal teaching context.)

In Mozambique, almost a third (30%) of Grade 6 pupils were without seats, and about 35% were without writing places. In five of the 11 provinces, the mean number of seats and writing places was lower than the country average (see Chapter 7, Table 7.1). This result contrasts with the situation in the SACMEQ countries as a whole, where 89.6% and 86.8% of Grade 6 pupils were equipped with seats and writing places respectively, with only four out of 14 school systems recording a lower than average mean for seats and writing places (see Chapter 7, Table 7.3).

Just over half of Mozambican Grade 6 pupils (53.2% in reading and 58.3% in mathematics) had their own textbooks, and in 6 of the 11 provinces the mean of pupils' having their own reading and mathematics textbooks was lower than the country average. With reference to the supply of books in SACMEQ countries on the whole, 43.8% and 45.4% of Grade 6 pupils had their own reading and mathematics textbook respectively, and in five and six out of the14 systems of education the mean of pupils' having their own reading and mathematics textbooks was lower than the SACMEQ average in both reading and mathematics respectively (see Chapter 7, Table 7.2).

c) What were the characteristics of the pupils involved in the SACMEQ II study?

The mean age of the pupils in Grade 6 in 2000 in Mozambique was 176.7 months (14 years old). The average age of the pupils in the study was four years older than expected. The high number of over-age pupils was due to a combination of factors such as the high levels of grade repetition and late entry into the first grade. The percentage of girls in Grade 6 in Mozambique was 40.3%. The northern provinces had the lowest percentage of girls in Grade 6, and in those provinces the MEC introduced a specific programme to promote the participation of girls in school. Other factors which helped describe the characteristics of pupils were the supply of meals and the number of books found in the home. In Mozambique, pupils in Grade 6 had an adequate number of meals per week, and on average, only 24.9% of Grade 6 pupils had books in their homes (see Chapter 6, Table 6.16).

In terms of pupils' backgrounds, in 2000 the mean age of pupils in Grade 6 in the SACMEQ countries as a whole was 164.8 months (13.7 years old). Taking into consideration the normal school entry age (6-7 years) in some countries, pupils were around two or three years older than expected. In Tanzania, as in Mozambique, this age issue could have been caused by late entrance into school and then by grade repetition. On average, 25.2% of Grade 6 pupils had books at home, which is slightly higher than the number in Mozambique. The percentage of girls in Grade 6 in the SACMEQ countries as a whole was 49.7%.

The pupils were asked about their mothers and fathers' level of education. The mean for parents having education in Mozambique was 5.9 in contrast with that in the SACMEQ countries as a whole, where the mean was 6.8. Pupils were living with their families or guardians in all countries. A second option was to live with relatives, and the school hostel was the third (see Chapter 6, Tables 6.16 and 6.20).

On average, 94.5% of the pupils in Mozambique and 77.6% of the pupils in the SACMEQ countries as a whole spoke the language of instruction at least sometimes at home. In only four of the 11 provinces in Mozambique, and in only six of the 14 systems of education in the SACMEQ countries, the percentage of pupils that spoke the language of instruction is higher than the average.

About three quarters of the pupils (78%), had repeated at least one grade in Mozambique. On average, Grade 6 pupils were absent for 2.7 days during the month preceding the testing (see Chapter 6, Table 6.18). These findings are compared with fewer than half of the pupils repeating grades across SACMEQ countries, and with their being absent for 1.7 days during the month preceding the testing (see Chapter 6, Tables 6.18 and 6.22).

d) What were the characteristics of the teachers involved in the SACMEQ II study?

Grade 6 Mozambican reading teachers were, on average, 32.7 years old, and mathematics teachers were 31.1 years old. In the SACMEQ countries, the Grade 6 teachers were slightly older at 36.9 years (reading) and 34.6 years (mathematics).

Less than a third (29.9%) of Grade 6 pupils in Mozambique were taught reading by teachers who were female, compared with more than half in the SACMEQ countries. Only 40.2% of pupils were taught mathematics by teachers who were female in SACMEQ countries.

Teachers in Mozambique are poorer than their SACMEQ counterparts. The average number of possessions[19] for reading teachers was 3.9, and 3.8 for mathematics teachers, compared with 6.1 for reading teachers and 5.5 for mathematics teachers in the SACMEQ countries as a whole (see Chapter 6, Tables 6.1 and 6.4).

Most reading and mathematics teachers in upper primary school in Mozambique do not have electricity at home, with an average of only 33.9% of reading teachers and 32.9% of mathematics teachers having electricity, as compared with half of the mathematics (58.3%) and reading (53%) teachers in the SACMEQ countries. Only 41.7% of mathematics teachers and 47% of reading teachers had electricity in their homes. The rest had to rely on candles or oil lamps in their homes for lighting for lighting their homes (see Chapter 6, Figures 6.2 and 6.7).

The *level of teachers' salaries* in Mozambique, for both reading and mathematics teachers, is the primary indicator of their job satisfaction. Only 39.4% of reading teachers and 45.4% of mathematics teachers indicate that they are satisfied in this respect. The main source of job satisfaction for the majority of Grade 6 reading and mathematics teachers in some SACMEQ countries was *seeing pupils learn*. The second most important source of job satisfaction for these teachers was the *salary level* (see Chapter 6, Tables 6.2 and 6.5).

[19] The minimum score that defines the social economic status is 0, and indicates that a teacher does not have any item in the list, with the maximum of 13, indicating that a teacher possesses all of the items in the list.

e) What were the professional profiles of the teachers involved in SACMEQ II study?

It can be seen that there were some differences in some SACMEQ countries with reference to teachers' training courses. The entrance level into teacher training colleges in all SACMEQ countries is Grade 12, except in Mozambique and Uganda where the entrance level is Grade 10. In 14 systems of education, six had a three-year duration and an admission requirement of level of Grade 12 (see Chapter 6, Tables 6.7 and 6.9).

A very small percentage of teachers who taught reading (4%) and mathematics (2.7%) in Mozambique did not have the required basic level of education (junior secondary schooling). It follows that 96% of the reading teachers and 97.3% of the mathematics teachers meet the government policy requirements (see Chapter 6, Tables 6.6, 6.10 and 6.13).

On average, the Grade 6 pupils in the SACMEQ countries were taught by reading teachers who had the following academic qualifications: 21.7% had A-level, 44, 9 % had senior secondary education, 16.5% had junior education, and 11.2% had only primary education. However, a mere 5.6% had tertiary education in SACMEQ countries (see Chapter 6, Tables 6.11; 6.12; 6.14 and 6.15).

How do teachers and pupils perform in reading and mathematics in Mozambique and in other SACMEQ countries?

In order to measure cognitive outcomes in the SACMEQ study, all countries tested teachers and pupils' reading and mathematics knowledge with the exception of South African and Mauritian teachers.

a) How did teachers perform in the reading tests in Mozambique and in other SACMEQ countries?

Taking into consideration that the teachers' test was similar to the pupils' test, it was expected that the teachers in Mozambique as well as in SACMEQ countries would perform well in relation to their pupils. Teachers achieved higher results on average than their pupils (see Chapter 7, Tables 7.1 and 7.3) with the teachers' averaging 716.2 in reading in Mozambique and 733.8 in the SACMEQ countries. Pupils in only 5 of the 14 systems of education had reading teachers who performed above the SACMEQ II mean.

With reference to the levels of competency reached by reading teachers in Mozambique and the other SACMEQ countries, the findings show that the lowest percentages can be observed at Levels

1, 2, 3, 4 and 5 and the highest percentages at Levels 7 (analytical reading) and 8 (critical reading) (see Chapter 8, Figures 8.1 and 8.2).

b) How did teachers perform in the mathematics tests in Mozambique and in other SACMEQ countries?

As in reading, it was expected that teachers in Mozambique and in the other SACMEQ countries would perform well in relation to their pupils. The Mozambican national average for the mathematics teachers was 782.8 points, as against the SACMEQ II mean of 792 points.

With reference to the levels reached by the Mozambican mathematics teachers, the findings show that the lowest percentages can be observed at Levels 1, 2, 3, 4 and 5 and the highest percentages at Levels 7 (problem solving) and 8 (abstract problem solving). With reference to the levels reached by mathematics teachers in the other SACMEQ countries, 8.9% of pupils had teachers that performed between Level 3 (basic numeracy) and Level 5 (competent numeracy), while 38.6% of the teachers reached the highest level, Level 8 (abstract problem solving) (see Chapter 8, Figures 8.17 and 8.18). It is expected that as teacher training programmes equip teachers more adequately, that their level of numeracy and/or literacy will improve and that the majority of them will be operating at the highest levels.

c) How did pupils perform in reading tests in Mozambique and in other SACMEQ countries?

In all SACMEQ countries, a mean score of 500 was set with a standard deviation of 100. On average, the pupil performance in reading in Mozambique was 516.7, In terms of levels of competency reached by Mozambican pupils in reading, the findings show that the lowest pupil percentages can be observed at Levels 1, 2, 7 and 8 and the highest percentages at Levels 4 and 5.

Despite the fact that the pupils in Grade 6 have had 6 years of schooling, 40% of the pupils in the SACMEQ countries performed between Levels 1 and 3 (basic reading). The majority (56%) performed between Level 4 (reading for meaning) and Level 7 (analytical reading) and only 3.7% performed at Level 8 (critical reading) (see Chapter 8, Figures 8.3 and 8.4).

Pupils' reading performance by gender, socio-economic status and school location

There was little difference in Mozambique between the sub-groups in terms of the mean and the levels achieved by pupils. On average, boys achieved 518.4 and girls 514.1 in reading. Furthermore, as expected, pupils from higher SES levels performed slightly better than pupils from lower SES levels (523; 510.5), while pupils from large towns performed better than pupils from small towns and isolated or rural areas (533.3; 510.5 and 502.3 respectively), having easier access to resources. Taking into account the three aspects of *gender, socio-economic status and school location*, in terms of mean, 17.6% of Mozambican pupils performed at Category 1 (pre/emergent/basic reading), while 20.9% at Category 3 (inferential/analytical reading) and 61.4% reached Category 2 (meaning/interpretative reading). (For further details, see Chapter 8, Figure 8.9.)

On average, girls performed slightly better in reading (505.1) than boys (494.6) in reading in the SACMEQ countries, except in Lesotho, Malawi, Mozambique, Tanzania and Zanzibar, where boys performed better in reading than girls. With reference to the levels reached by pupils in reading, on average 42.3% of the boys and 37.7% of the girls in the SACMEQ countries performed at Category 1, and 36.6% of the boys and 37.7% of the girls reached Category 2, while 18.1% of the boys and 19.6% of the girls reached Category 3. Finally, 3.5% of the boys and 4.8% of the girls performed in Category 4. (For further details, see Chapter 8, Figure 8.10 and 8.11.)

On average, pupils from a low SES in the SACMEQ countries had 482.4 points in reading, while pupils from a high SES had 519.9 points. In all of the SACMEQ countries, pupils from a higher SES reached higher categories in reading than pupils from a lower SES. (For further details, see Chapter 8, Figure 8.12 and 8.13). Pupils from isolated/rural areas in the SACMEQ countries had a reading mean of 482 points, as against those from large towns, who had 540.7 points, a difference of 58.7 points. (For further details, see Chapter 8, Figure 8.14 and 8.15.)

i) How did pupils perform in the mathematics tests in Mozambique and in other SACMEQ countries?

Pupils achieved 530 points in mathematics in Mozambique. In the other SACMEQ countries, 70.1% of pupils in Grade 6 performed between Levels 1 (pre-numeracy) and 3 (basic numeracy). Taking into consideration that at Level 4 pupils are at a stage only of “beginning numeracy,” the conclusion is that 70.1% of SACMEQ pupils performing under this level will not have mastered the initial numeracy skills. Only 1.5% of Grade 6 pupils reached Level 8 (abstract problem solving). (For further details, see Chapter 8, Figures 8.19 and 8.20.)

Pupils' mathematics performance by gender, socio-economic status and school location

Boys in Mozambique performed better than girls in mathematics (537 and 519.5 respectively) and pupils from a higher SES performed better than pupils from a lower SES (532.6 and 527.5 respectively) while pupils from large towns performed better than pupils from isolated or rural areas and small towns (536.7, 527.5 and 524 respectively). On average, within the three aspects (gender, SES and school location), 54.7% of pupils reached Category 1, while 43% reached Category 2 and 1.8% reached Category 3 (Chapter 8, Figure 8.25).

On average, as expected, boys performed better in mathematics (501.7) than girls (498.1) in the SACMEQ countries. However, in Botswana, Lesotho, Mauritius, Seychelles and South Africa, girls performed better in mathematics than boys. On average, in terms of the levels of performance reached by pupils in mathematics, 69.6% of boys and 71% of girls in the SACMEQ countries performed at Category 1 (for more details see Chapter 8, Tables 8.26 and 8.27).

On average, pupils from a low SES in SACMEQ countries had 486 points in mathematics, in comparison with pupils from a high SES, who had 515.2 points. In all SACMEQ countries, pupils from a higher SES reached higher categories in mathematics than pupils from a lower SES. 64.7% of pupils from a higher SES and a 75.1% from a lower SES respectively performed at Category 1. (For further details, details see Chapter 8, Figures 8.28 and 8.29.)

Following a trend, pupils from isolated/rural areas achieved 487.4 points in mathematics, as compared with those from large towns, who had a mean of 526.7. In all SACMEQ countries, pupils living in large towns achieved higher categories of performance than pupils living in isolated or rural areas.

Using the SACMEQ II data archive, Zhang's (2006) analysis revealed that in some SACMEQ countries rural pupils not only lagged behind their counterparts in reading ability but were also learning in unfavourable school conditions, an important factor for academic success in general. Pupils from rural areas generally belong to lower SES families and they tend to have less home support for their academic work. In addition, rural students tend to be older than their urban counterparts as a result of their late entry into the school system, a higher incidence of grade repetition, or a combination of both. In addition to poor conditions, schools in rural areas have fewer instructional resources, fewer facilities, and their teachers have lower reading scores (see Chapter 8, Figures 8.30 and 8.31).

Taking the SACMEQ results into consideration it seems that in some countries, despite significant efforts from the Ministries of Education, many children do not have access to proper school facilities such as buildings, books, basic equipment, running water and electricity, as well as good teaching resulting from their teachers having academic qualifications as well as being professionally trained. However, it would require a massive integrated programme to address all of these interrelated issues in an attempt to improve teacher competence and pupil performance.

The following section presents and discusses the main predictors of pupil performance in reading and mathematics in Mozambique and in other SACMEQ countries.

Phase 2 – Exploratory analysis:
This section presents a summary of the main predictors of pupil performance in reading and in mathematics in Mozambique and in the other SACMEQ countries in relation to the findings. Firstly, the presentation focuses on the main findings in reading, followed by the main findings in mathematics.

The maximum number of predictors in Mozambique was seven in reading and eight in mathematics, while in the SACMEQ countries as a whole there were 29 predictors in reading and 30 in mathematics. All variables included in the Multiple Regression Model (stepwise) were statistically significant (for more information see Chapter 9 Tables 9.24 - 9.29).

The main predictors of pupil performance in reading in Mozambique were pupils' speaking Portuguese at home, pupils' absent-work, untrained teachers, inadequately trained teachers, taking extra tuition in Portuguese, the number of periods taught by the school head, grade repetition and pupils age, while in mathematics the main predictors of pupil performance were: pupils absent-work, the frequency with which teachers' give written mathematics tests, the frequency with the teacher meets the parents, the activities of a school head, teachers' satisfaction with the quality of the school building , the age of the school head, pupils' possession of school materials (factor), and whether or not pupils were asked questions about mathematics (see Chapter 9, Tables 9.24 and 9.27).

The ten main predictors of pupil performance in reading in the SACMEQ countries were pupils' socio-economic status, pupils' speaking the language of instruction at home, total school resources, pupils' repeating grade 6, teacher/parent contact, the number of books at home, pupils' being absent, classroom resources, pupils' paying for extra tuition and pupils' age; while the ten main predictors of pupil performance in mathematics were pupils' speaking the language of instruction at home, pupils' socio- economic status, pupils' paying for extra tuition, the experience of the school head in this school, the teachers' source of lighting at home, the number of books in pupils' homes, the homework given, pupils' grade repetition, extra tuitions in other subjects, and the pupils' classroom material (see Chapter 9, Tables 9.25 and 9.28).

The conceptual framework for this study, adopted and adapted from Cheng and Tsui's model (1998) "total teacher effectiveness" (see Chapter 5, Section 5.3 Figure 5.1), is used for the analysis of the conclusions of this study. As previously said, the second phase is the exploratory part of the study conducted to address the central research question, namely: What is the effect of teacher competence on pupils´ performance in upper primary school in Mozambique and in the other SACMEQ countries?

This section presents and discusses the main predictors of pupil performance in reading within each domain and construct of the conceptual framework to address the research question. The preparatory steps of the correlational analyses that preceded the regression analyses are not summarised here and can be found in Chapter 8.

The Cognitive Domain

None of the variables in the cognitive domain appear as a predictor of pupil performance in reading in Mozambique (see Chapter 9, Tables 9.4 and 9.24). Examining the SACMEQ countries as a whole, only one factor, *teachers with primary education only* (β = -0.058; p =0.005), appeared as a predictor of pupil performance, although it was not one of the 10 main predictors. For instance, for each teacher unit increase in the variable t*eachers with primary education only*, pupils' scores decreased by only 0.087 units (See Chapter 9, Tables 9.5 and 9.25).

Similarly, in mathematics in Mozambique none of the variables in the cognitive domain appear as a predictor of pupil performance. (See Chapter 9, Tables 9.4 and 9.27). In SACMEQ countries as a whole, three variables (*teachers with primary education only*, *teachers with secondary education, and teachers' academic qualification)* appear as predictors of pupil performance in mathematics. For instance, for each unit *increase of teachers' academic qualification* (β = .060; p =.001) the pupils' score increased by 0.44 units, meaning that if teachers had high academic qualifications, pupils tended to perform better. Conversely, pupils whose teachers had low academic qualifications tended to achieve low scores as well, indicating a similar performance pattern between teacher and pupils. The first two factors listed above had negative effects, namely teachers with primary and secondary education (see Chapter 9, Tables 9.5 and 9.28).

The Affective Domain

The level of *teachers' satisfaction with the quality of school buildings* ($\beta = -.159$; $p \leq .01$) appears as a predictor of pupil performance in mathematics in Mozambique but not in SACMEQ (see Chapter 9, Tables 9.4, 9.5, 9.25 and 9.28).

The Behavioural Domain

The results indicate two factors within the behavioural domain. *Pupils' speaking Portuguese at home* ($\beta = .346$; $p \leq .000$) appears as the strongest predictor of pupil performance in reading in Mozambique among eight factors, meaning that for each unit increase in *pupils' speaking Portuguese at home,* pupil performance increased by 27 units. Pupil absenteeism (*pupils' absent-work*) was another factor in the behavioural domain that was a predictor of pupil performance in reading, and was the third most important predictor. In Mozambique for each unit increase in pupils' absenteeism, pupils' scores decreased by 15 units, meaning that pupils who were more frequently absent from school tended to perform poorly (see Chapter 9, Tables 9.4 and 9.24).

In SACMEQ countries, *speaking the language of instruction at home* ($\beta = .194$; $p \leq .000$) was the second strongest predictor of pupil performance in reading, meaning that pupils who spoke the language of instruction at home tended to perform better in reading. In the behavioural domain, *the frequency with which teachers met pupils' parents* ($\beta = .120$; $p \leq .000$) was another predictor of pupil performance in reading, and was ranked 5th, meaning that a teacher who meets the parents at least once a year has pupils who tend to achieve better scores. Pupil absent-work ($\beta = -.106$; $p \leq .000$) was a negative predictor of pupil performance in reading, and was ranked seventh.

In the behavioural domain, other predictors of pupil performance in reading were *pupils' absenteeism, the teachers' reading approach, and the school head's experience in this school*, but they were not among the 10 main predictors of pupil performance in reading in the SACMEQ countries (see Chapter 9, Tables 9.5 and 9.25).

In the behavioural domain, the results indicated that in mathematics *pupil absent-work* ($\beta = -.261$; $p \leq .000$) appears to be the strongest predictor of pupil performance in Mozambique and is the first of eight factors. Thus, for each unit increase in *pupils' absenteeism*, pupil performance decreased by 9.50 units. In the behavioural domain, the *frequency with which teachers meet parents* ($\beta = .188$; $p \leq .005$) also appears as a predictor of pupil performance in mathematics, and was ranked 3rd in position. For each unit increase in *teachers' meeting parents*, pupils' scores increased by 1.90 units, meaning that pupils who had teachers that met their parents more frequently tended to achieve a better performance. The *activities of the school head* was another predictor belonging to the behavioural domain, and was ranked in position 7, ($\beta = .164$; $p \leq .016$) while the f*requency with* *which teachers give written mathematics test* (β = -.141; $p \leq .005$) was ranked in 8^{th} position (see Chapter 9, Tables 9.4 and 9.27).

In the SACMEQ countries, *speaking the language of instruction at home* (β = .159; $p \leq .000$) appears as the 2^{nd} predictor in pupil performance in mathematics, meaning that pupils that spoke the language of instruction at home tended to perform better in mathematics. For each unit increase in *pupils' speaking the language of instruction at home*, pupil performance increased by 4.48 units. Another predictor in the behavioural domain was the *experience of the school head* in this school (β = 0.136; $p \leq .000$), with a negative effect on pupil performance. This means that pupils tended to achieve lower with a school head who had more years of experience in that same school. Another factor in the behavioural domain, but not one of the 10 main predictors, *was pupils' absent-work* (β = .098; $p \leq .000$). (See Chapter 9, Tables 9.5 and 9.28.)

Pupils' absent-work had a negative effect on pupil performance in reading and in mathematics in Mozambique and in the other SACMEQ countries, which means that the more days pupils are absent, the more likely it is that their performance in reading and in the mathematics test would be lower. Mathematics in particular follows a constructive step-by-step approach. Particular concepts and skills are prerequisites for the next level of understanding. Therefore, pupils who are absent will manifest gaps in their learning and as a result will tend to fall behind.

The Teacher Training Construct

In Mozambique only, being taught by a *teacher with no training at all* (β -0.197; $p \leq .001$) had a negative effect, whereas short training (β = .131; $p \leq .033$) was a positive predictor of pupil performance in reading. This result means that pupils who had teachers without training tended to have lower scores, with each unit of increase in *no teacher training* resulting in the pupils' scores decreasing by 0.23 units (see Chapter 9, Tables 9.6 and 9.24).

Only two variables showed a noticeable relationship between teacher training and pupil performance in reading and in mathematics in the SACMEQ countries: in-service teacher training (β = -.044; $p = .035$) and *no teacher training* (β = -.042; $p \leq .050$). However, neither of them was one of the10 main predictors of pupil performance. Pupils who had teachers that had had in-service training only or no teacher training at all tended to achieve low scores in reading (see Chapter 9, Tables 9.7 and 9.25). In the SACMEQ countries, 7 out of 14 systems of education and about 50% of the reading teachers had two years of professional training (see Chapter 6, Table 6.12).

In Mozambique, none of the factors that comprise the teacher training construct were predictors of pupil performance in mathematics (see Chapter 9, Tables 9.6 and 9.27).

In the SACMEQ countries, as in reading, only two variables had a relationship with pupil performance in mathematics. However, only being taught by a teacher with more than 3 years of training ($\beta = .039$; $p \leq .034$) was a predictor of pupil performance in mathematics. Pupils who had teachers with more than three years of training tended to perform better than those who had teachers with fewer than three years. For each unit increase of teacher training, pupil scores increased by 0.054 units (see Chapter 9, Tables 9.7 and 9.28).

The Teacher Characteristics Construct

The *teachers' total possessions at home, the teachers' source of lighting at home, and the gender of the school head* were not predictors of pupil performance in reading In Mozambique (see Chapter 9, Tables 9.6 and 9.24). This finding was in contrast to the position in the SACMEQ countries, where the predictors of pupil performance in the teacher characteristics construct included the *source of lighting* as a predictor of pupil performance in reading. The *source of lighting* is also related to the school location, teachers' SES and the level of salary. Teachers who have electricity in their homes perhaps have access to more information via the radio or television, and they would also have better conditions within which to work, particularly at night, while correcting their pupils' work or for lesson preparation and administration. Teachers' possessions were a negative predictor of pupil performance in reading. Teachers' possessions are also reflected in other ways, such as through the teachers' SES, which is of course related to the level of the teachers' salaries (see Chapter 9, Tables 9.7 and 9.25).

In Mozambique, the *age of the school head* ($\beta = -.172$; $p \leq .013$) was a predictor of pupil performance in mathematics, meaning that the age of the school head had association with pupil performance in mathematics. In the SACMEQ countries, as in reading, the *teachers' source of lighting at home* ($\beta = -.132$; $p \leq .000$) had a negative effect of pupil performance in mathematics and was the fifth strongest predictor (see Chapter 9, Tables 9.6, 9.7, 9.27 and 9.28).

The External Teaching Context Construct

In Mozambique in the external teaching context construct only one variable, *extra tuition in Portuguese*, ($\beta = -.151$; $p \leq .019$) seems to have a negative effect of pupil performance in reading, but did not appear as a predictor of pupil performance in mathematics (see Chapter 9, Tables 9.8 and 9.24).

In the external teaching context, the *total school resources* ($\beta = -.139$; $p \leq .000$) was a predictor (the third strongest) and had a positive effect on pupil performance in reading in SACMEQ countries. This result meant that pupils attending schools with more resources were more likely to achieve higher test scores than those pupils in which schools were poorly resourced. For instance, for each unit increase of school resources, pupils' scores increased by 0.306 units. Often poorly performing pupils attend extra lessons, but in this case *Pupils paying for extra tuition* ($\beta = -0.103$; $p \leq .000$) had a negative effect with very little improvement in performance being observed. Another predictor of pupil performance in reading was *school location*. Pupils in large towns tended to perform better than their counterparts in small towns and rural or remote areas (see Chapter 9, Tables 9.9 and 9.25).

None of the variables in the external teaching context construct was a predictor of pupil performance in mathematics in Mozambique (see Chapter 9, Tables 9.8 and 9.27).

Pupils' paying for extra tuitions ($\beta = -.145$; $p \leq .000$) was the 3rd strongest predictor of pupil performance in mathematics in the SACMEQ countries. *Pupils' extra tuitions - other subjects* ($\beta = -.108$; $p \leq .000$) was rated in position nine and had a negative effect on pupil performance. Another variable that was a predictor of pupil performance in mathematics was the *condition of school building* (see Chapter 9, Tables 9.9 and 9.28).

The Internal Teaching Context Construct

In Mozambique only the *number of periods taught by a school head* ($\beta = -.191$; $p \leq .003$) was a predictor (the 4th strongest - negative) of pupil performance in reading. For each unit increase of the *number of periods taught by the school head*, a pupil's score would decrease by 143 units, meaning that more periods for school head resulted in lower pupil performance in Mozambique (see Chapter 9, Tables 9.8 and 9.24).

In the SACMEQ countries, teachers' total classroom resources ($\beta = -.104$; $p \leq .000$) was the 8th strongest predictor. For each unit increase in the shortage of teachers' classroom resources, pupil performance decreased by 1.59 units. The *number of periods taught by a school head* appears as a negative predictor of pupil performance in mathematics (see Chapter 9, Tables 9.9 and 9.25).

In Mozambique, *pupils' school material* ($\beta = -.208$; $p \leq .003$) was the second strongest predictor of pupil performance in mathematics. For each unit increase in the shortage of school material, pupil performance decreased by 1.2 units meaning that more *pupils' school material* resulted in better pupil performance (see Chapter 9, Tables 9.8 and 9.25).

Four factors appear as predictors of pupils' performance in mathematics in the SACMEQ countries. One of these was the *homework given* ($\beta = -.113$; $p \leq .000$) (the 7th strongest). For each unit increase in the homework given, pupil performance increased by 2.47 units. The lack of *pupils'* *school material* (β = -.107; p ≤ .000) (the 10th strongest) was a negative predictor of pupil performance in mathematics. For each unit of increase in the shortage of school material, pupils' performance decreased by 1.11 units.

Two factors appear as a predictor of pupil performance in mathematics in the SACMEQ countries, namely *owning mathematics textbooks*, a positive predictor. Pupils with textbooks tended to achieve better results than those without or sharing textbooks - and the *number of periods taught by a school head*, which was a negative predictor (see Chapter 9, Tables 9.9 and 9.28).

The Pre-Existing Pupils' Characteristics Construct

In Mozambique *pupils' grade repetition* (β = -.173; p ≤ .006) (fifth strongest) and *pupils' age* (β = -.128; p ≤ .032) (8th strongest) were predictors of pupil performance in reading. Mozambique has high numbers of over-age pupils and a high percentage of grade repetition, particularly in rural areas. The two variables, *grade repetition* and *age*, are perhaps related to the fact that the more repetition pupils undergo, the older they become, which means they are over age for their grade (see Chapter 6, Tables 6.16 and 6.18, and Chapter 9, Tables 9.10 and 9.24).

It is important to refer to the fact that of the 10 main predictors of pupil performance in reading, four belong to pre-existing pupils' characteristics. In the SACMEQ countries *pupils' socio-economic status* (SES) (β = -.279; p ≤ .000) is the strongest (1st position) predictor of pupil performance in reading. For every increased unit for pupils' SES, pupils' scores increased by 1.114 units. The variable, *pupil repeating grade 6* (β = -.139; p ≤ .000) is in the 4th position as a predictor of pupil performance in reading. For every increased unit for pupils repeating Grade 6, pupils' scores decreased by 10.19 units. The *number of books at home* (β = .118; p ≤ .000) is the 6th predictor, meaning that pupils that had books at home tended to perform better than those that did not. *Pupils' age* (β = .099; p ≤ .006) is also a predictor of pupil performance in reading and is rated in tenth position, meaning that the pupils' age had an apparently positive effect on pupil performance in reading. Another positive predictor of pupil performance was pupils' evening meals. Pupils that had an evening meal tended to perform better than those that did not (see Chapter 9, Tables 9.11 and 9.25).

Pre-existing pupils characteristics do not appear as a predictor of pupil performance in mathematics in Mozambique (see Chapter 9, Tables 9.10 and 9.25). This outcome is not surprising because in Mozambican school system there is some equity even though there is disparity in terms of SES between pupils in rural areas and pupils in large towns and cities.

As with reading in the SACMEQ countries, four of the 10 main predictors of pupil performance in mathematics belong to the pre-existing pupils' characteristics category, meaning that pupil performance variation is explained more by pre-existing pupils' characteristics than by other variables in the study such as school and teacher variables. The same factors as in reading appeared as predictors of pupil performance in mathematics: SES ($\beta = .150$; $p = .000$) was ranked in the second position; the *number of books at home* ($\beta = -.118$; $p \leq .000$) in the 6th position; *grade repetition* ($\beta = -.0,111$; $p \leq .000$) in the 8th position and *pupils' evening meals* ($\beta = .107$; $p \leq .000$) in the tenth position. *Pupils' age* is another predictor in the SACMEQ countries, but was not one of the 10 main predictors of pupil performance in mathematics (see Chapter 9, Tables 9.11 and 9.26).

The Parent and Community Contribution Construct

The community's contribution is a composite of school facilities such as classrooms and teachers' houses; the maintenance of school facilities (such as classrooms, teachers' houses, etc.); the construction or maintenance and repair of furniture and equipment; the purchase of textbooks; the purchase of other school supplies, materials and/or equipment; the purchase of stationery; the purchase of other school supplies, materials and/or equipment; the payment of examination fees; the payment of an additional amount on top of the normal salary of teachers; the payment of the salaries of non-teaching staff; the payment of an additional amount on top of the normal salary of non-teaching staff; extra-curricular activities, including school trips; assisting teachers in teaching and/or teaching or supervising pupils themselves without pay; and the provision of school meals.

There were no predictors of pupil performance in reading arising from the parents' and community's school involvement in Mozambique (see Chapter 9, Tables 9.10 and 9.24).

In reading in the SACMEQ countries, only the community's *contribution of textbooks* to the school appeared as a predictor of pupil performance in reading.

In Mozambique, only the variable having to do with *asking questions about mathematics* was a predictor of pupil performance in mathematics (see Chapter 9, Tables 9.11 and 9.27). In the SACMEQ countries, the *community's contributions of furniture and equipment* to the school appeared as a predictor of pupil performance in mathematics (see Chapter 9, Tables 9.11and 9.28).

10.2 DISCUSSION AND REFLECTION

The purpose of this section is to discuss and reflect on the results of the study. The reflection will start with a critical review of the methodology and how the approach has influenced the results.

The second part is a more substantive discussion and reflection in which the main results arising from the analysis are compared with the results of other research projects on the same topic.

10.2.1 Reflection on the Methodology

Firstly, all fourteen systems of education involved in the SACMEQ project, applied the same instruments and followed the same methodology. In this secondary study, one of the limitations is the fact that data collected in 2000 is used for analysis in 2007. A number of things could have changed in the seven years, although systemic change takes time. A further limitation is that this study was constrained by to what was available in the SACMEQ II database, which is not the same as collecting data for a specific study.

For example, class observation is crucial to assessing teacher performance in teaching reading and in mathematics in Grade 6. As explained by Medley and Shannon (in Dunkin, 1997), the main tools for assessing teacher performance are observational schedules. However, as this study is a secondary analysis, the results of teachers' completing the SACMEQ II reading and mathematics tests were used to assess teacher competence, rather than observation. Classroom observation may have enhanced the assessment of teacher competence within the classroom context.

The set of variables in the SACMEQ database was organised according to the conceptual framework presented in the study, and some of the variables that composed each domain and construct were grouped using Principal Component Analysis (PCA), which, according to Smith (2002), has the advantage of reducing the number of dimensions without much loss of information. All SACMEQ variables were included in the correlation matrix except those related to *inspection, teacher adviser and resources centre* in the external teaching construct, because they did not measure what they were supposed to measure and were excluded from SACMEQ III. The teachers and pupils who were included the SACMEQ II study represents a school sample, meaning that the 20 pupils selected belong to a school and not to a specific class. Hence, pupils were aggregated to school to calculate the correlations and regression.

Authors have previously used the regression model to study the determinants of pupil achievement. Carr (2006), for instance, applied the regression model to find the main determinants of pupil achievement. Factors such as student attendances, the proportion of teachers rated as highly qualified, and student mobility show statistical significance in the partial regression coefficient in Carr's study. Haegeland, Raaum and Salvanes (2005) separated the effect of school resources from the effect of family background in the study of pupil achievement determinants, since resources may be allocated to schools in a compensatory manner. The family background has a positive effect on pupil performance, but the quantity of resources and the teacher hours per pupil had only a moderate effect. Teacher qualifications do not appear to have a significant effect on school results and, in addition, the quality of resources, as measured by teacher characteristics, does not appear to have a significant impact on pupils' marks. The regression model was also used in this study to identify the variables that had an effect on pupil performance. However, the emerging factors may differ from studies conducted in European and Western countries. Thus, the context of the study - that of Africa - needs to be taken into account.

It is within the framework of this literature review that the regression model was used in this study to understand the determinants or predictors of pupil performance in Mozambique and in other SACMEQ countries. Applying the regression model gives the effects of each explanatory variable in each domain and construct in the conceptual framework, while controlling the impact, and the predictor can be ranked accordingly. The results could therefore be used in policy formulation and decision making to improve the quality of education by allocating the resources in alignment with the most important predictors.

The next section presents and discusses the main predictor of pupil performance in reading in each domain or construct of the conceptual framework.

10.2.2 Reflection on Conceptual Framework and the Results

The original Cheng and Tsui model of teacher effectiveness was further developed in their 1998 model of teacher effectiveness. The Cheng and Tsui model has been modified and adapted to relate to the African education systems and social context under study, and rather aligned with to the data available for this study. Figure 10.1 reflects the changes that have been made to the model, which were discussed in Chapter 5 (see Section 5.3).

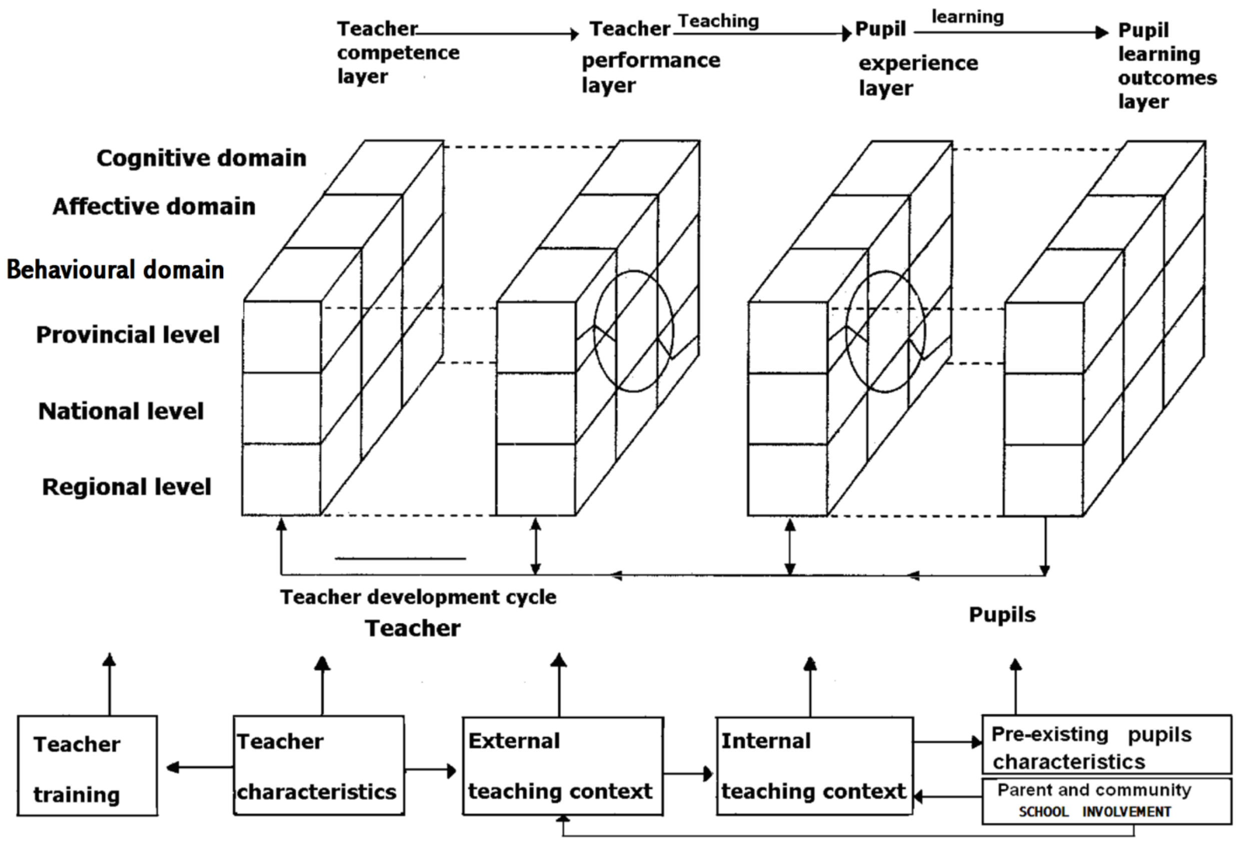


Figure 10.1 Levels of teacher effectiveness (adapted from Cheng and Tsui, 1998, p.41)

The Cognitive Domain

In Mozambique, the variables that comprised the cognitive domain did not appear as a predictor of pupil performance in reading and in mathematics. In the SACMEQ countries as a whole, and in three of the 14 systems, a number of variables that comprise the cognitive domain appear as predictors for pupil performance (see Chapter 9, Tables 9.24 to 9.29). The variables that comprise the cognitive domain and teacher training are referred to in the literature as the requisites for a competent teacher, namely subject knowledge, curriculum knowledge and professional training, as confirmed by Medley and Shannon (1994), Shulman (1986), and Grossman (1995).

Analysing the school systems, country by country, in which pupils performed below the SACMEQ mean, one should take note that the greater part (in fact, nearly half) of the teachers in Lesotho had only primary education (49.6%) and within this group 31.1% had 3 years of teacher training (see Chapter 6, Table 6.12). The academic level of teachers may explain the low level of pupil performance in reading (see Chapter 8, Figure 8.4). Mothibeli and Maema reveal that “some teachers’ highest academic qualifications were the primary education that the pupils themselves were just about to attain” (2005, p.179). But in the final analysis “teacher performance was much higher than pupils’, although a small percentage of them – probably those with primary school education as their highest academic qualification – were performing at the same level as a small percentage of the pupils they taught" (2005, p.185).

South Africa was one of the countries where a significant percentage of teachers had only primary education (27.1% - see Chapter 6, Table 6.12) and pupil performance in reading was below the SACMEQ mean (492 - see Chapter 8, Figure 8.3). Moloi and Strauss (2005) state that the possible cause of these results could be systematic gaps in the manner in which reading and general literacy development takes place in the schools. These systematic gaps could be in educator training levels, the availability and use of reading materials in schools, or a combination of these and other factors. Where pupils performed below the SACMEQ mean in the other countries, the teacher had acceptable levels of academic qualifications, but the level of pupil performance is low in the case of Malawi, Namibia, Uganda, Zambia and Zanzibar.

Other factors such as the teachers' knowledge of the contents of primary education or lack of professional training may be able to explain low pupil performance. Those results confirm what was felt by authors such as Grossman (1995), Medley and Shannon (1994) and Westera (2001), who pointed out the importance of teacher subject knowledge and professional training as part of teacher competence, and their link with pupil performance. In this regard, Shulman (1986) argued that "the person who presumes to teach subject matter to children must demonstrate knowledge of that subject matter as a prerequisite to teaching. Although knowledge of the theories and methods of teaching is important, it plays a decidedly secondary role in the qualification of a teacher." Sedel (in Verspoor, 2003) confirms this position and emphasizes that the two indicators most frequently used to measure the overall quality of teaching personnel in primary schools where teachers teach according to established standards are the required academic qualifications and primary school teacher training.

The content knowledge as well as the aims or objectives of each subject are vital, as stressed by Postlethwaite and Ross (1992), who affirm that schools which produce good results have teachers that have a good knowledge of the aims of the education system, the syllabi and materials, and which teaching strategies are most likely to address those aims. Thorough knowledge of the aims and goals of the subject is the first step towards achieving excellent performance.

In the SACMEQ countries as a whole and in 3 of the 14 education systems, teachers' academic qualifications appear as a predictor of pupils' performance. In the literature, authors such as Shulman (1986), Hargreaves and Fullan (1992), Eraut (1994) and Westera (2001) stress the importance of teacher subject knowledge as part of teacher competence. As Postlethwaite and Ross explain (1992), schools which achieve well have teachers with sound knowledge of their subject matter, sound pedagogical knowledge and skills, and good classroom management skills. Table 10.1 present the main predictors of pupil performance in reading and in mathematics in Mozambique and in SACMEQ countries.

Table 10.1

Main predictors of pupil performance in reading and in mathematics in Mozambique and in SACMEQ countries

Domains and Constructs	Reading		Mathematics	
	MOZ	SACMEQ	MOZ	SACMEQ
Cognitive	-	Teacher with primary education only	-	Teacher with primary education only Teacher with secondary education Teacher qualification-academic
Affective	-	-	Teacher. satisfaction-school building quality	-
Behavioural	Speaking Portuguese at home Pupils' absent - work	Pupils speak lang. of instruction home Pupils' absent – work Pupils' absent Teacher/pupils' parents meet/year Teacher reading approach (factor) S. head experience this school	Pupils' absent – work Teacher. frequency giving written math test Teacher frequency meeting parents School head activities	Pupils speak lang. of instruction home Pupils' absent-work S/ head experience this school
Teacher Training	No teacher training Short training	In-service training No teacher training	-	More than 3 years of training
Teachers' characteristics	-	Teachers' source of lighting Teacher. possessions	School head age level	Teachers' source of lighting
External teaching context	Extra tuition in Portuguese	School location Total school resources [max=22] Paying for extra tuitions	-	Paying for extra tuitions Extra tuition- others subjects School location School building condition Total school resources
Internal teaching context	School head number of periods	S. head number of periods Teacher. access to material (factor)	Pupils' school material (factor)	Pupils' school material (factor) Sharing/owning math textbooks Homework given School head number of periods
Pre-existing pupils' characteristics	Grade repetition Pupils' age	Pupils' socio-economic status The number of books at home Pupils' evening meal Age in months Pupils repeating G6	-	Pupils' socio-economic status Age in months Pupils Grade repetition The number of books at home Pupils' evening meal
Parents and community school involvement	-	School contributions by community-textbooks	Asked questions about mathematics	School contribution. community furniture. equipment.(factor)

The Affective Domain

In Mozambique in reading, and in the SACMEQ countries as a whole in both reading and mathematics, the affective domain is not a predictor of pupil performance. However, the affective domain is a predictor of pupil performance in reading within individual SACMEQ countries and their systems of education. Only 8 (3 in reading and 5 in mathematics) out of the 14 had a significant relationship, with 6 having a positive effect on pupil performance and 2 a negative effect. Gronlund (2000) explain that responding to and valuing the environment shows that teachers' behaviour then becomes consistent with the internalised values. For instance, the level of teachers' satisfaction with the quality of school buildings, classroom furniture, the quality of the management of the school, and the availability of teachers' houses appear as predictors of pupil performance in reading and in mathematics. In the same way, the level of teachers' satisfaction with the quality of school buildings appears to be a predictor of pupil performance in mathematics in Mozambique, This confirms what was found in previous studies, that "Teachers who worked in higher prestige schools characterised by good working conditions, who enjoyed good relationships with other teachers and parents, and who felt a part of school structure, tended to report high levels of job satisfaction" (Rodgers-Jenkinson and Chapman, as cited in Fraser, Draper and Taylor, 1998, p.68). Authors such as MacDonald (1999), Evans (1997), and Cockburn (2000) stress the effects of teacher satisfaction on pupil performance and demonstrate the relationship between teaching experience and student achievement (Lundberg and Linnakyla, 1993) (see Chapter 9, Tables 9.26 and 9.29).

Teachers' living conditions might be related to the level of salary. Lack of recognition of teaching experience and of their progress in terms of professional knowledge and skills through their career is a demotivating factor, particularly when teachers with many years of teaching indefinitely hold the same position and salary as those at beginning of their careers. It is thus important to recognise that financial incentives may have to play a major role in recruitment. Teachers require sufficient money to look after their everyday needs (Cockburn, 2000). The level of teacher salaries is therefore highlighted in the literature as one of the causes of teacher dissatisfaction, as also of difficulties in teacher recruitment and retention (MacDonald, 1999). MacDonald stresses that one of the reasons for teacher attrition is the stagnation of the profession, the lack of recognition and development of skills throughout a career. In addition, MacDonald refers to the importance of the quality of school conditions as one of the causes of teachers' dissatisfaction. Thus there is the need for applied effort to improve schooling by enhancing teachers' working lives (Evans, 1997).

The Behavioural Domain

Speaking the language of instruction at home appears as the strongest predictor of pupil performance in reading in Mozambique, confirming what emerged from other cross-national studies such as TIMSS and PIRLS. "The extent to which the test language was spoken at home, and whether one or both parents spoke the language of the test at all**,** were combined to form the composite language background variable. This factor showed a positive correlation, indicating that the stronger the test-speaking language background, the higher the achievement (Australia, in TIMSS study)" (Papanastasiou, 2000, p.5). In the PIRLS study Greaney and Kellaghan (2008) claim that "students who spoke the language used in assessment at home tended to have higher scores than students who spoke other languages" (p.117). They found the same result in Programme d'Analyse des Systèms Éducatifs de la CONFEMEN (Programme on the Analysis of Education System, or PASEC) in which the use of French in a child's home was related to pupil performance.

In Mozambique (only in reading) as well as in SACMEQ countries, *speaking the language of instruction at home* is one of the strongest predictors of pupil performance in reading and mathematics. Across the SACMEQ countries 5 out of 14 systems of education in reading and 3 out of 14 in mathematics show speaking the language of instruction at home as a predictor, confirmin*g* what was found in other cross-national studies such as in TIMSS (Papanastasiou, 2000) and in PASEC studies (Greaney and Kellaghan, 2008). Howie (2002) confirms the same finding in TIMSS 1999: "The language spoken at home was also found to be a relatively strong predictor (p=0.18) as supporting evidence and pupils that spoke the language of the test (English or Afrikaans) were more likely to achieve higher test scores than those not doing so" (2002, p.169).

Pupils' days absent

Pupils' absenteeism had a negative effect on pupil performance in reading and mathematics in Mozambique and the other SACMEQ countries. Across the SACMEQ countries, pupils' absenteeism was a significant variable in 3 of the 14 systems in reading and in 5 of the 14 in mathematics. In the past, many authors such as Smith (1979) and Summers and Wolfe (1977) have referred to the relationship between pupil performance and the number of days of absent. Differences will exist between the academic performance of students in classes where absences are concentrated on a small number of days and the academic performance of students in classes where absences are more evenly spread over all possible days. Monk and Ibrahim (1984) stress that during the school year, early absences and late absences are related in different ways to pupil performance depending on when and how frequent the absences are. Students who are present in a class beset with absenteeism are adversely affected academically by the absences of their peers (Monk and Ibrahim, 1984).

In contrast, the PASEC study conducted by Greaney and Kellaghan (2008) revealed that the number of days that teachers were absent from school also had a negative effect on pupil performance.

The frequency of teachers' meeting pupils' parents

In Mozambique and in the SACMEQ countries as a whole, the frequency with which teachers meet pupils' parents is a predictor of pupil performance in mathematics and in reading. Across the SACMEQ countries, *the frequency of teachers' meeting pupils' parents* is a predictor of pupil performance in reading in Mauritius. Christensen et al. (1992) stresses the importance of the connection between the home and the school. Across all of the SACMEQ countries, home factors associated with acquiring reading literacy, and parental or caregivers' involvement in children's schooling may be key to the development of literacy (Mullis et al., 2004, p.30): "Parents' or caregivers' involvement can reinforce the value of learning to read, monitor children's completion of reading assignments for school, and encourage children through praise and support."

The Teacher Training Construct

Having an untrained teacher or a teacher with little training appears as a predictor of pupil performance in reading in Mozambique. In the SACMEQ countries as whole, having a teacher with no training or with only in-service training, and having a teacher with more than three years of teacher training appears as a predictor of pupil performance in reading and in mathematics. There is no relationship between teacher training and pupil performance in Mozambique or the other SACMEQ countries, and this finding confirms what was found in previous studies of the same issues.

To illustrate the above finding, four factors have emerged from the Mozambican context each of which may relate to or contribute to poor teacher training. The first factor could be that most teachers undergo the same level of teacher training, or the training curriculum is subject to similar problems as seen in the difficulty of setting a teacher training policy. The second factor is the type of candidate who elects teaching as a profession. For instance, primary school teaching has not been seen as an attractive profession in Mozambique since 1975, and the smart or excellent pupils are therefore not recruited when they leave secondary school. The third factor is the fact that during the last 30 years in Mozambique, teacher training has undergone many changes and there is still to date no clear policy for teacher training (see Chapter 2, Table 2.4). The number of courses introduced is indicative of the nature of the current policy in the teacher training field in Mozambique. The fourth factor is related to the selection of trainers in the teacher training college. The Ministry of Education and Culture selects the trainers from Pedagogical University (UP), where teachers for secondary education are trained. However these trainers, who then work in the teacher training colleges, do not know the methodologies for primary school education, and they do not have experience in primary school teaching. Teachers with degrees in Portuguese or Mathematics teach in secondary schools but do not necessarily have the subject knowledge to teach the specific subjects or the relevant didactical knowledge for primary education. In this case, the quality of teacher training is poor as is indicated in Chapter 2. The MEC does in fact recognise that the quality of the education and training provided in the institution is often inadequate. “Teachers at all levels are often under qualified for the posts they hold” (MINED, 1998, p.9). As a result of these factors, the MEC defined expanding access to education, improving educational quality and sustaining expansion and improvement as priority activities, and teacher training is part of this programme (Strategic Plan for Education, 1998).

As can be seen in Table 8.1, professional training, pre-service and in-service training does not have a relationship with pupil performance in any provinces. This lack of relationship means that pupil performance in Mozambique is determined by other variables, such as the pupils’ background, rather than by professional teacher training. This conclusion confirms what was found in previous studies in which professional training did not make a significant difference because of the trainer profile and the structure of the teacher training curriculum (Passos and Cabral, 1989; and Passos, Navesse and Chiau, 2000).

Authors such as Hargreaves and Fullan (1992), Chapman and Mählck (1997), and Kanu (1996) stress the quality of teaching as a key issue for education quality. As stated by Abagi and Odipo (1997) of the Kenyan situation, “Another pertinent issue about the efficiency of teachers is their qualifications. Traditionally, education researchers and planners have believed that professionally trained teachers are more efficient and effective than untrained ones. That is why the government [spent] 2.2% of its 1996/97 financial year educational expenditure on teacher education” (p.19).

In two countries, namely Tanzania and South Africa, professional training is a predictor of pupil performance in reading and mathematics, but a negative predictor. More than 3 years of training had positive effects on pupils’ performance in the SACMEQ countries as a whole in mathematics, but was not one of the 10 main predictors. Confirming what was stressed by many researchers (Hargreaves and Fullan, 1992; Sander and Horn, 1998; Raudenbush, Eamsukkawat, Di-Ibor; Kamali andTaoklam, 1993 in Kanu, 1996) teachers should clearly become “the vanguard of the effort” to improve pupil performance. In the PASEC study conducted in West Africa (Greaney and Kellaghan, 2008), teachers’ initial and in-service training appears important in determining pupil performance. However, “voluntary” teachers (employed by parents) were more effective than teachers who were civil servants.

The Teacher Characteristics Construct

In the SACMEQ countries as a whole, teachers' source of lighting as well as teachers' *possessions* are predictors of pupil performance in reading. They reflect the condition in which teachers live and their socio-economic status. Teachers' living conditions are linked, as previously stated, to teacher satisfaction, which has an effect on pupil performance, as confirmed by MacDonald (1999), Evans (1997) and Cockburn (2000).

Teachers' possessions and teachers' source of lighting (electricity) reflect the teachers' SES in SACMEQ countries, which in turn could be related to the level of teachers' salaries. MacDonald (1999) asserts that socio-economic factors that have been attributed to increasing attrition include living conditions, attitudes towards family responsibilities, health and ethnicity. The author also stresses that teachers tend to leave positions where living conditions are extremely poor, harsh or overly expensive. Cockburn (2000) confirms MacDonald's findings.

The age and the years of experience of the school head would have an influence on motivating the teaching staff and thus on pupils' performance. In this study, the age of the school head had a negative effect on pupil performance in mathematics in Mozambique. A study carried out in Nigeria about the performance of school heads shows that the performance in the age bracket of 40-49 years is substantially better than those in age groups 30-39 and 50 and above (Ehiametalor, 1985). In addition, the same study shows that unless school heads are exposed to further training and development in school administration and thus undergo professional development, there tends to be no significant difference in performance between a school head with four to 11 years of experience and one with 20 years of experience (Ehiametalor, 1985).

The Internal Teaching Context Construct

The availability of pupils' school material is a predictor of pupil performance in mathematics in Mozambique and in reading in the SACMEQ countries. The shortage of pupils' school material had a negative effect on pupil performance both two cases. Anderson suggests that "When equipment and materials are needed, this equipment and these materials should be readily available to the students" (1991, p.38). If there is a shortage of basic material such as exercise books, pens, and pencils, pupils became passive learners, because it is not possible to take notes about the lesson or complete exercises to apply what they learn and as a result, teaching and learning becomes ineffective.

The number of periods taught by a school head is a predictor of pupil performance in Mozambique in reading, and in the SACMEQ countries in both subjects (although not one of the top 10), with a negative effect. As noted in Chapter 8, it seems that the amount of time spent by the school head on teaching implies a reduction of the time the school head spends on school management, which may have a negative effect on pupil performance. However, there may also be other possible interpretations: Wylie (1997), in a New Zealand study, found that teaching school head workloads are greater than those of non-teaching school heads while Grift and Houtveen’s (1999) findings which emerged from the study carried out in 1993 in The Netherlands, showed that there is a significant relationship between educational leadership and pupil performance.

The External Teaching Context Construct

Total school resources is a predictor of pupil performance in reading and in mathematics in SACMEQ countries as a whole. In three of the 14 systems of education, school resources appeared as a predictor of pupil performance in reading and in mathematics. As stated by Chowdhury (1995), the quality of the infrastructure in developing countries is poor, as is the school equipment, particularly in rural areas. Researchers such as Anderson (1991), Abagi and Odipo (1997) and Zhang (2006) confirm the negative effects of the lack of or poor school resources on pupil performance. “When equipment and materials are needed, this equipment and these materials should be readily available to the students” (Anderson, 1991, p.38). Poor quality teaching, curriculum, instructional materials and school infrastructure can have an adverse effect on student learning (Chowdhury, 1995, p.9).

Extra tuition in the SACMEQ countries as a whole (and especially in Portuguese in Mozambique) and paying for extra tuition appear as predictors of pupil performance in reading and in mathematics. Murimba (data) claims that “in several countries, e.g. Seychelles, Zimbabwe and Mauritius, extra tuition has reached levels that are morally not justifiable. Because streaming and extra tuition are associated with good learning outcomes, they tend to find implicit support among educators and parents” (2005, p.95).

The Pupils’ Characteristics Construct

The pre-existing pupils’ characteristics construct is the strongest predictor of pupil performance in reading in Mozambique and in the SACMEQ countries, emerging as a predictor of pupil performance in all 14 systems of education. In mathematics, pupils’ characteristics appear as a predictor in 12 out of 14 system of education, the exceptions being Mozambique and Zanzibar (see Chapter 9, Tables 26 to 29). With reference to the PASEC study, Greaney and Kellaghan (2008) confirm that “a variety of individual student and family characteristics (including parents’ literacy and the use of French in the student’s home) were related to student achievement” (p.138). As confirmed by Garden (1997), the success of individual pupils is strongly related to pupils’ characteristics and their home environment, and these are predictors of pupil performance.

A *pupil's age* (determined by entering school later or repeating a grade resulting in more mature pupils) is a predictor of performance in reading in Mozambique, and in the SACMEQ countries in reading and in mathematics (although not one of the top 10). *Grade repetition* and *age* are possibly related (see Chapter 6, Tables 6.7 and 6.18), as pointed out by Zhang (2006), who notes that in rural areas students tend to be older than their urban counterparts as a result of their late entry into the school system and their higher incidence of grade repetition, or a combination of both (p.596).

A *pupil's socio-economic status* is the strongest predictor of pupil performance in reading and the second strongest in mathematics in the SACMEQ countries as a whole. Examining country by country, it can be observed that a *pupil's SES* is a predictor of pupil performance in 10 out of the 14 systems of education in reading, and 8 out of the 14 systems of education in mathematics. This variable emeges in many studies (Becker, 1981; Gold Miles, 1981; Anderson, 1991; Postlethwaite and Ross, 1992; Dustmann, Rajah and Soest, 1998; Epstein, 1998 in Gold and Miles 1981; Howie, 2002; Mulls, Kennedy, Martin and Sainsbury, 2004; Kotte, Lietz and Lopez, 2005; and Lee, Zuze and Ross, 2005) which stress the relationship between pupils' backgrounds and their performance.

Grade repetition is a predictor of pupil performance in reading in Mozambique and in reading and in mathematics in the SACMEQ countries. Examining the SACMEQ countries, it can observed that seven out of the 14 systems of education grade repetition as a predictor of pupil performance in reading and six out of the 14 systems of education in mathematics. Grade repetition could be a reflection of the quality of the teaching and of schools conditions, as pointed out by Zhang (2006): "In addition, rural students tended to be older than their urban counterparts, as a result of late entry into the school system, a higher incidence of Grade repetition, or a combination of both. Even though many schools in the SACMEQ countries might benefit from a boost in physical and human resources, this was especially true in rural areas, where more school buildings needed major repairs, where teachers had fewer instructional resources, where schools had fewer facilities, and where teachers had lower reading scores" (p.596). According to Chowdhury (1995), the long distances to and from school in developing countries and the poor school facilities, especially in rural areas, contribute to weaker pupil performance as well as to the pupil dropout and repetition rate. Lee, Zuze and Ross (2005) show that repetition rates are much higher in sub-Saharan Africa than in developed countries. Results from the Kenya study reveal that Kenyan primary education has had internal efficiency problems such as a great deal of wastage stemming from low completion and high repetition rates (Abagi and Odipo, 1997, p.10). Greaney and Kellaghan are of the opinion that "students might appear to benefit from Grade repetition, but the gains [are] only temporary" (2008, p.138).

The *number of books at home* is a predictor of pupil performance in reading and in mathematics in the SACMEQ countries. In two out of the 14 systems of education, it is a predictor of pupil performance in reading, and in four out of the 14 systems of education of mathematics. According to Mulls, Kennedy, Martin and Sainsbury (2004), an important aspect of the home environment is the availability of reading material and educational resources. Greaney and Kellaghan (2008) concur. They report that in the First International Comparative Study of Language and Mathematics in Latin America, carried out by Laboratorio Latinoamericano de Evaluación de la Calidade de la Educación (the Latin American Laboratory for Assessment of the Quality of Education, or LLECE), the results indicate that SES varies considerably among countries. However, the relationship is more pronounced in Argentina and Brazil than in Cuba, which had relatively little variation in the level of parental education. In Cuba, 72% of the pupils in rural areas achieved Level III in mathematics. Elley (1992) and Greaney and Kellaghan (2008) argue that the number of books in the home correlates significantly with pupil performance in mathematics. If pupils can borrow books from the school library, this occurrence minimises the problem raised by Postlethwaite and Ross (1992), that the number of books in the classroom or in a school library, and also at home, have a positive impact on pupil performance. This is a particularly pertinent aspect to consider in an African environment, where books are sorely lacking. Despite their acknowledgment of the importance of school libraries and the role they play in pupil performance, the Ministry of Education and Culture in Mozambique has found it difficult to provide books to schools, and has even found it difficult to provide textbooks on time for all pupils. However, there are some initiatives aimed at providing libraries at schools.

Pupils' evening meals appear as a predictor in reading (not in the top 10) and in mathematics in SACMEQ countries. In five of the 14 school systems, the pupils' evening meal emerges as a predictor of pupil performance in reading and in mathematics. The number of pupils' meals per day or week reflects in some ways the level of pupils' SES. Studies such as that conducted by Postlethwaite and Ross (1992) show that pupils' backgrounds (including the number of meals per week) correlate with pupils' reading literacy scores. Etsey (2005) points out that the parents of pupils from the high-achieving schools always provide breakfast before their children go to school.

The Parent and Community Contribution Construct

Community involvement is a predictor of pupil performance in reading in Mozambique and in SACMEQ countries. Authors such as Fullan (2001), drawing from research, emphasise that community involvement has a positive effect on pupil performance. In Kenya, Abagi and Odipo (1997) identified the factors that contribute to pupils losing interest in school, as evidenced in poor performance and high repetition and drop-out rates, and divided them into three categories: education policies and institutional processes; school-based factors; and household- and community-based factors. In addition to the factors internal to education systems impinging on pupils' rates of success, Abagi and Odipo (1997) also identified factors in the family and community, namely a household's attitudes, initiation ceremonies and tradition, lack of opportunities, high cost, gender issues, flawed socialization, and debilitating religious principles. In the PIRLS study, for example, higher performance was obtained by the pupils of parents with favourable attitudes to reading (Greaney and Kellaghan, 2008).

Community involvement is a predictor of pupil performance in mathematics in the SACMEQ countries. It was found in the PISA study that parental education and support were strongly related to pupil performance in mathematics (Greaney and Kellaghan, 2008) and the finding is reinforced by Fullan (2001) and Abagi and Odipo (1997), who too claim that community involvement has a positive effect on pupil performance.

The next sections present and discuss the main conclusion and recommendations of the study.

10.3 CONCLUSIONS AND RECOMMENDATIONS REGARDING POLICY AND PRACTICE

This section presents the main conclusions of the study concerning teacher competence and its effects on pupil performance in reading and in mathematics in Mozambique and other SACMEQ countries, taking into consideration the conceptual framework. This section also highlights the main recommendations of the study for Mozambique and other SACMEQ countries if applicable.

1. The hypothesised model of teacher competence (effectiveness) fits the SACMEQ data as a whole consistently better for reading than for mathematics.

For the SACMEQ countries as a whole the data in reading are consistent with the model, although they occupy only 2 domains, namely the cognitive and behavioural, and the following 6 constructs: teacher training, teacher characteristics, the internal and external teaching contexts, pre-existing pupils' characteristics, and parents' and the community's involvement. But if we examine the countries separately, the picture changes. The data are not consistent with the model in Botswana (1), Malawi (2), Seychelles (2), Swaziland (2) and Tanzania (2), where only one or two out of the nine domains or constructs are predictors of pupil performance. No individual country fills the model completely. The maximum number of domains and constructs (7) was found in Namibia, and comparing the reading results with the adapted Cheng and Tsui model it is evident that the cognitive and affective domain are not predictors of pupil performance in reading in Namibia.

As in reading, it can be stated that in some ways the data in mathematics in the SACMEQ countries support the conceptual framework, with eight out of the nine domains and constructs being present in the model, the exception being the affective domain. Again, no individual country completely fits the adapted Cheng and Tsui model. It can be claimed that Swaziland (2) Lesotho (3), Malawi (3) and Zanzibar (3) show that the data are not consistent with the model, as only two or three out of the nine domains or constructs are predictors of pupil performance. But in Botswana and Uganda six out of the nine domains and constructs are statistically significant predictors. The following domain and constructs are not predictors of pupils' performance in the two countries: the affective domain in both, the cognitive domain and the internal teaching context in Botswana, and the external teaching context and teacher characteristics in Uganda.

In Mozambique, the model explains more in reading (*adj* $R^2 = .434$) than in mathematics (*adj* $R^2 = .320$). In SACMEQ countries, the results indicate that the model fits better and explains more in reading ((*adj* $R^2 = .529$) than in mathematics ((*adj* $R^2 = .489$). (See Chapter 9, Tables 9.25 and 9.28.)

<u>Recommendation</u>: *from the results it can be said that the model can be used in SACMEQ countries, but more adaptation is needed in individual SACMEQ countries***.**

2. More predictor variables of pupil performance were found for mathematics in SACMEQ as a whole than at country level.

In the SACMEQ countries, the Multiple Regression Model confirms what was found in the correlation (see the Tables of Correlation in the Appendices). Out of all of the variables, 22 in reading and 23 in mathematics in the SACMEQ countries had positive or negative effects on pupil performance. In the SACMEQ countries, the Variation Inflation Factor (VIF) varies between 1,050 and 5,021 in reading, and from 1,113 to 4,660 in mathematics. In Mozambique, eight variables in reading and eight in mathematics had positive or negative effects on pupil performance. In Mozambique, VIF varies between 1,025 and 1,150 in reading, and between 1,020 and 1,077 in mathematics. Hence, the results of the regression model were lower than 10 meaning that the variables are not related and the model is satisfactory in Mozambique and in SACMEQ countries (see Chapter 9, Tables 9.24 to 9.28). Nevertheless, not all of the predictors operated in the same way in Mozambique and in the SACMEQ countries. For example, grade repetition had positive effects on pupil performance in Mozambique where some repeaters were doing a little better than others, but in the other SACMEQ countries the effects were negative in that even though pupils repeated, there was little improvement in their performance.

Recommendation: *Generally speaking, there is a need to improve the professional qualifications of teachers, including subject knowledge, especially for reading teachers in Mozambique and in other SACMEQ countries. It is necessary also to increase the level of academic qualification of teachers, taking into consideration the level at which they are teaching. It is not acceptable that a teacher with only a primary school education teaches at the Grade 6 level.*

3. More predictor variables were found at pupils' level for reading and mathematics than at teachers' and school levels in Mozambique and the other SACMEQ countries.

In Mozambique eight of the variables had effects on pupil performance in reading, namely one allocated to the school head, five to pupils, and two to teachers; and in mathematics three were allocated to teachers, two to school heads and three to pupils. In the SACMEQ countries 23 variables had positive or negative effects on pupil performance in mathematics, of which two were related to the school head, six to the teachers, 12 to the pupils and three at school level. In reading 22 variables had positive or negative effects on pupil performance, namely two related to the school head, nine to pupils, eight to teachers and two to schools. As explained in Chapter 9, the cognitive domain (teacher academic education) is a predictor of pupils' performance in mathematics in the SACMEQ countries, but is not one of the 10 main predictors. This result means that subject knowledge has more effect on pupil performance in mathematics than in reading. In other words, pupils' results in mathematics depend on teachers' competence: that is, the more effective the teachers, the better the pupils' results in mathematics.

Pre-existing pupils' characteristics, the behavioural domain, and teacher training are the main predictors of pupil performance in reading and in mathematics in Mozambique, with the behavioural domain being the main predictor of pupil performance. In SACMEQ, the behavioural domain is the main predictor of pupil performance in reading, while pre-existing pupils' characteristics is the main predictor of pupil performance in mathematics.

Recommendation: *It seems that mathematics teachers had a greater impact than teachers of reading on pupil performance, but there is a need to improve the professional qualification of mathematics teachers in the SACMEQ countries.*

4. For teacher competence, more predictor variables were found related to teachers' academic qualifications than directly to teachers' training levels.

This finding was the case for Mozambique in reading and in mathematics, and overall for SACMEQ countries in reading and in mathematics. Teachers' academic level, teachers' subject knowledge (teachers' performance in the SACMEQ II tests), and teachers' professional training (pre- and in-service) are the most important variables emphasised in the literature as having to be taken into consideration with teacher competence (Westera, 2001, Grossman, 1995, Shulman, 1986, Mendel and Shannon, 1999). Darling-Hammond's (1999) findings indicate a consistent and significant positive relationship between the proportion of well-qualified teachers and student achievement on the National Assessment of Educational Progress (NAEP) reading and mathematics assessment. This result is confirmed by Vlaardingerbroek and Taylor (2003) in the TIMSS study, in which they found evidence to reinforce the view that primary teacher training ideally occurs in a university, and involves a 4-year degree programme.

The relationship between teacher competence and teachers' subject knowledge is emphasized by some studies. In the TIMSS study, Vlaardingerbroek and Taylor (2003) stress that teachers' attainment at high school emerged as a principal correlate with TIMSS rankings. Better rankings were also associated with the existence of mandatory science 'content' studies as part of teacher training. These observations are consistent with the axiom that teachers' competence in primary science arises largely from their own mastery of scientific concepts (pp. 429-438). Grossman et al. (1989) insist that without the essential base of subject matter knowledge, primary teachers are simply unable to provide effective instruction. The level of confidence in subject matter affects teaching and the way the teachers teach (Shulman, 1986).

***<u>Recommendations</u>*:**

1 - The results of teacher performance in the reading and mathematics tests indicated the need for better selection criteria for teacher training programmes in Mozambique and in the other SACMEQ countries. The examination to select the candidate must include subject knowledge assessment and investigation into the mastery of primary education content, to ensure that the candidate has the knowledge requisite to teaching in primary education. It is acknowledged that the purpose of teacher training courses is to provide professional training for the candidate in the disciplines of Psycho-Pedagogics and Didactics rather than to provide academic knowledge. However, if it is necessary, teacher training colleges should organize extra sessions to improve the students' knowledge of the subjects taught in a primary school and then submit the students to examination. It is important to stress that if teachers do not have the knowledge of each subject, it is not possible for them to teach at primary level. The candidate must be competent in primary *education subjects before being able to be an effective teacher. Primary school subject knowledge must therefore be a pre-requisite for entering a teacher training course. The most important factor to stress is that professional training is as important as may be of lesser importance than subject knowledge no nevertheless essential subject knowledge. The combination of the two is pre-requisite to training a competent teacher.*

2 - As noted in Chapter 2, since Mozambique achieved its independence in 1976 the Ministry of Education and Culture has implemented many teacher training models, but at present it does not have an ideal model for teacher training. One of the problems with teacher training is the frequency with which the Ministry of Education and Culture makes and implements curriculum changes. The changes that take place do not take into consideration the educative process as a whole, and the aims and objectives of the change are not stated. The Ministry's decision makers do not take research findings into account when implementing changes.

Some additional recommendations and suggestions can be offered for the teacher training process as "curriculum plans, instructional materials, elegant classrooms and even intelligent administrators cannot overcome the negative effects of weak teaching or match the positive effects of positive teaching. The entire formal and informal curriculum of the school is filtered through the hearts and minds of classroom teachers, making the quality of school learning dependent on the quality of teachers" (Holmes Group, 1986, p.2323 in Kanu, 1996, p.174). From a review of the literature, one can conclude that the concept of competence is complex and that there are many factors that contribute to teacher competence. The literature reviewed overlooks two important aspects which one could consider in developing teacher competence in teacher training institutions. The first is the competence of the trainers in the institutions, and the second is the availability and quality of the staff of annexe schools.

In Mozambique, for example, no single factor is sufficient to develop competence in teacher trainees. The MEC should approach all of the processes and the factors involved as a whole. For instance, the fact that the factors illustrated in Figure 10.2 below are balanced is of paramount importance.

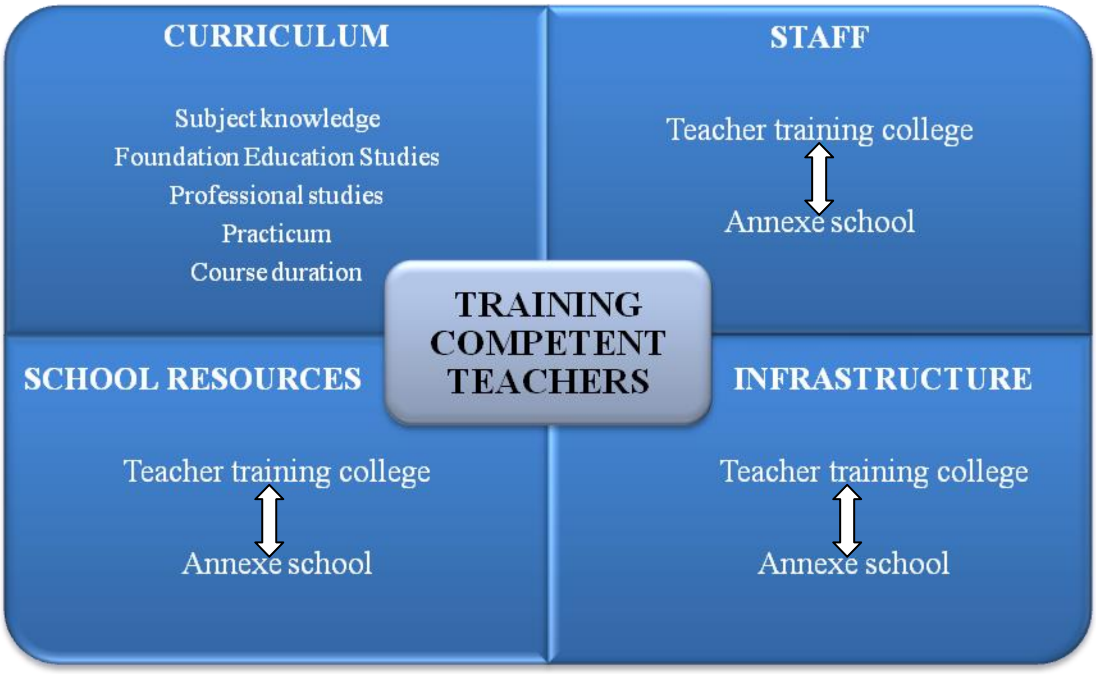


Figure 10.2 A model for developing teachers training competence in Mozambique (Passos, 2009)

Figure 10.2 seeks to specify the factors that may be involved in the development of teacher training competence, and to establish relationships among them. In training competent teachers it is important to consider not only the curriculum for teacher training but also the other components that play a vital role in the process of teacher training, like the members of staff, the school's resources and teacher training colleges and annexe schools, as shown in the figure. All of these components must be considered as a whole.

Training competent teachers may depend on factors such as the quality of the curriculum, staff competence and expertise in teacher training institutions, the availability of resources and funding and the relationship of teacher training institutions with annexe schools to allow successful practica to be completed.

The quality of the **curriculum**, particularly taking into consideration the four elements referred to by Ben-Peretz (1995, p.543**),** which are: the Subject-matter to be taught, Foundation of Education studies, Professional studies, and Practicum. Subject knowledge is a pre-requisite for entry into the teacher training college, because if subject knowledge is part of the teacher training programme, it would be overloaded at the expense of the foundation and professional studies, as Dzvimbo and Lima's study (1994) revealed. The curriculum should be designed and developed in accordance with the level of education in which the trainees are to be trained to teach - in this case, primary education - in order to develop the competence of the students to teach. In this way, the curriculum should be aligned with the education needs of the country and take into account good school practices.

The **staff** competence of the teacher training institution should match the curriculum goals and practices. The teacher training curriculum, whether primary or secondary, should be directly linked with the qualifications and experience of the staff in both the teacher training colleges and the annexe school, as staff competence and qualifications play an important role in developing teacher competence. Besides other qualifications (a first degree or postgraduate degree), they must have professional training and experience at the same level in which they are training (primary or secondary education). The teacher is the key to educational quality

School resources are determined by the curriculum in terms of material and amount of financial support. Even though quality teaching and good results can be achieved with poor curricula, materials or infrastructure, lack of school resources and financial restraints affect the training of teachers as well as the standard of education in a country. This aspect is particularly important in the Mozambican context where, even if the infrastructure is lacking and resources are scarce, teacher competence could ensure the delivery of quality education (Alberto and Mahumane, 2000). However, the lack of infrastructure, the lack of school resources and the poor conditions that prevail in Mozambican schools have to be taken into consideration, as well as the internal (e.g. books, time in the class, class resources) and external teaching contexts (e.g. the school building, the library, the school's equipment) as these have a huge impact on teaching and learning. But note should to be taken of the specific resource and financial needs, implemented in the teacher training curriculum, which would differ, depending on whether the training is for primary or secondary education.

Infrastructure - in order for the practicum to be successfully implemented, teacher training colleges must be aware of the annexe schools with whom they align themselves. Annexe schools are an integral part of teacher training and an essential aspect in the teacher training process, and a relationship must therefore be developed between the two institutions. Aspects to consider are the size of school, the number of pupils, the school year and the timetable, so that they can conveniently accommodate the student teachers and implement the teacher training curriculum, as all of these factors are important in promoting good teacher training. The staff of the annexe schools and the conditions under which they receive student teachers must be organized to achieve the teacher training goals as well as the school's own objectives.

As stressed by Carr (2006), teachers are the front line of the education system, and intuition tells us that improving their quality should improve the quality of the service they provide.

5. Across the SACMEQ countries, on average one out of five pupils in reading and one out of two pupils in mathematics have not attained the minimum basic requirements in these subjects by the end of Grade 6.

In the SACMEQ countries, 22% of the Grade 6 pupils performed at Levels 1 (pre-reading) and 2 (emergent reading), and 40% of the pupils performed at Levels 1 (pre-numeracy) and 2 (emergent numeracy) in mathematics. These percentages imply that those pupils cannot read at all. In countries like Zambia (47.7% in reading and 71.2% in mathematics), Malawi (45.5% in reading and 74.3% in mathematics), Namibia (43.4% in reading and 76.6% in mathematics), South Africa (in 31% reading and 52.2% in mathematics) and Lesotho (24.4% in reading and 65.9% in mathematics), where pupils performed at Levels 1 and 2 in reading and mathematics, which is extremely low for Grade 6, special attention from key stakeholders including the Ministry of Education is necessary. The high percentage of pupils at those two levels has far-reaching implications in terms of the internal and external efficiency of the education system. The quality is low, and the pupils who performed at this level cannot proceed to higher levels of schooling. The teaching of reading and writing skills begins at Grade 1 and 2 levels in the case of Mozambique.

Recommendations:

1- **Further study**: The Ministries of Education in SACMEQ countries and in particular the countries with a high percentage of pupils who cannot read need to carry out two kinds of research studies. One would be designed

a) To assess the learning of reading and writing skills in primary education, identifying appropriate strategies and ways of addressing challenges

and the other would be designed

b) To assess all teachers training processes with a focus on the methodology of teaching reading and writing skills. (See "Further studies" in Section 9.3.)

2 - **Pre-Primary:** According to Fuentes and Nieto (2005), the early years of education are gaining more and more recognition and are the subject of studies and research all over the world. Taking into consideration that in Mozambique most pupils do not attend pre-primary education and do not speak Portuguese when they enter a school, it is suggested that pre-primary skills be introduced in a

compulsory class. However, in order to maintain the same number of classes (5) in lower primary, Grades 1 and 2 could be combined into one year. This innovation means that pre-primary pupils can learn the foundations of reading and mathematics, such as speaking, reading and writing, and skills related to mathematics like recognising position and size, before progressing into Grade 1, where the pupils would acquire and develop initial reading, writing and numeracy skills.

According to Passos (1995), a study carried out in Mozambique in the first grade shows that pupils who attended preschool or kindergarten were better equipped than others for the acquisition of reading skills. Abadzi (2005) found the same result: that reading achievement was lowest among pupils who had not attended preschool. This outcome is true internationally (the World Bank, 2006).

Mendes, Neves and Guedes (2000) explain that success in further learning depends significantly on the pupils' access to quality preschool education, which constitutes an irreplaceable factor in the learning process, as the first stage in basic education and as a way to achieve the objective of quality education for all, as defined by the UNESCO. Education for All (EFA) stresses that early childhood care and education contribute to good child development outcomes that set the foundation for lifelong learning, and helps in the monitoring of health and nutrition status during this critical period of development (EFA, 2005, p.82). In addition, Fuentes and Nieto (2005) argue that politicians have recognised that quality pre-primary education can constitute the sound foundation of a child's learning for the rest of his/her life. It is known from experience that children at this stage of their education are young investigators with an enormous, creative potential, capable of reasoning and thinking.

The problem militating against including pre-primary in the education system in Mozambique is usually described as being financial, but it is imperative for the Ministry of Education to rethink the costs of grade repetition in terms of the internal and external efficiency of the system, the costs for parents, and the frustration for teachers, pupils and parents. Using PASEC and SACMEQ data, Fehrler, Michaelowa and Wechtler (2006) have stressed that repetition generates high costs, because the system has to cope with an increased overall number of pupils and an increase in early drop-out. Although repetition of under-prepared learners is at times necessary, the effects of repetition on pupils' learning have consistently been shown to be negative rather than positive.

Finally, it is vital to stress that the acquisition and teaching of reading skills is a challenging task for pupils and teachers, but attending preschool lays a foundation for the acquisition of reading and writing skills for both teachers and pupils. According to Sedel (inVerspoor, 2003), "the challenge of basic education policy is not only a challenge of quality but also one of equality: of equal opportunities to learn and achieve” (p.43).

6. Reading performance is strongly related to mathematics performance.

Pupil performance in reading is strongly related to pupil performance in mathematics in Mozambique ($r = .778$, $p = 000$) and in the SACMEQ countries as a whole ($r = .874$; $p = 000$). Examining individual SACMEQ country levels, the correlation between pupil performance in reading and in mathematics varies from ($r = .629$; $p = 000$) in Malawi to ($r = .940$; $p = 000$) in Namibia. However, reading performance is related to speaking the language of instruction at home, in Mozambique ($r = .428$; $p = 000$) and in the SACMEQ countries as a whole ($r = .351$; $p = 000$). In individual SACMEQ countries the correlation ranges from ($r = .225$; $p = 000$) in Namibia to ($r = .589$; $p = 002$) in Seychelles. For more details, see the tables of correlations in the Appendices. Pupils’ speaking the language of instruction at home, is one of the strongest predictors of pupil performance in reading in Mozambique, and in both subjects in the SACMEQ countries. As evidence of this phenomenon, a study carried out in India shows that “There was a positive association between the mean percentage score in language and mathematics, the correlation between the two being 0.73. Thus the districts with a high achievement level in mathematics also depict high achievement level in language” (Aggarwal, 2000, p.9). Researchers found the same results in other cross-national studies such as in TIMSS (Papanastasiou, 2000), TIMSS 1997 (Howie, 2002), and PASEC and PIRLS studies (Greaney and Kellaghan, 2008).

The results draw attention to the need for special attention from key stakeholders, including the Ministry of Education. The higher percentage of pupils performing between Levels 1 and 3 in reading and mathematics has far-reaching implications in terms of the internal and external efficiency of the education systems. The quality is low, and pupils who performed within this level cannot proceed to higher levels of schooling. Basic reading, writing and numeracy skills are learnt at the Grade 1 and 2 levels in Mozambique, which means that when pupils reach Grade 6 their literacy levels should have developed beyond Levels 1 and 3 in SACMEQ tests.

Recommendation: *Due to the important role that the language plays in pupil performance, it is critical to rethink the strategy of teaching the language of instruction. This teaching implies more investment in terms of resources like textbooks and libraries, and improved teacher training programmes. The Ministries of Education need to consider their language policies, taking into account the role of the mother tongue and the acquisition of the language of instruction and then to develop appropriate strategies to teach this language of instruction.*

7. Pre-existing pupils' characteristics and the behavioural domain were the main predictors of pupil performance in reading in Mozambique, and in reading and in mathematics in SACMEQ countries.

Four pupil variables affecting pupil performance in reading were found in Mozambique, in comparison with the two teacher variables. Examining the distribution of the variables in reading in the SACMEQ countries, it can be observed that of all the variables, 16 had positive or negative effects on pupil performance, namely 4 for school heads and 6 each for teachers and pupils.

Recommendations: *Pre-existing pupils' characteristics, in particular pupils' SES, are the strongest predictors of pupil performance. One of the possible ways to reduce the negative impact of pupils' disadvantage in Mozambique would be to create a kind of association in which the parents, companies, and the economic and social sectors can play a part by paying tax to help children who are disadvantaged. The money can provide uniforms, textbooks, school materials and breakfast or tea at school during the school year. Another possibility is the payment of tax by parents to provide breakfast or tea at school for all pupils during the school year with sponsoring disadvantaged children. The money could be managed by schools and representatives of the community commission.*

8. Pupils who speak the language of instruction at home tend to achieve higher results in both reading and mathematics.

Speaking the language of instruction at home is one of the strongest predictors of pupil performance in reading in Mozambique, and in both subjects in the SACMEQ countries. Pupils who speak the language of instruction at home tend to achieve better performance in reading and in mathematics. This variable plays an important role in pupil performance as the more children who speak the language, the better their achievement in reading and in mathematics.

Recommendation: *In certain SACMEQ countries such as Mozambique, Mauritius and Uganda, the language of instruction from Grade 1is not the mother tongue. However, although their performance was not the best, these countries did perform better than some other countries where the pupils learn in the mother tongue. Taking into consideration the SACMEQ results of those countries, it is recommended that the language of instruction to be used in a pupil's school career should be introduced from Grade One either as the oral and written language or as an oral subject in the countries that use bilingual education.*

However, if the countries that apply bilingual education already teach the language of instruction from Grade 1, those countries need to rethink the language policy and in particular, the methodology used to teach the language.

9. Teachers' satisfaction is a predictor of pupil performance in mathematics in Mozambique and in some individual SACMEQ countries.

The affective domain is a predictor of pupil performance in some individual SACMEQ countries. For instance, the quality of school buildings, classroom furniture, of the school management, and the availability of teachers' houses appears as a predictor of pupil performance in reading and in mathematics. The quality of school buildings appears as a predictor of pupil performance in mathematics in Mozambique.

Teachers' satisfaction is indicated in the literature as one of the factors related to teachers' performance. According to Fullan (1992) teachers teach in the way they do not only because of the skills they have or have not learned. The way they teach is also grounded in their background, their biographies, and in the kinds of teachers they have become. Their careers, their hopes and dreams, their opportunities and aspirations, and the frustration of these things important determinants of teacher commitment and morale. According to Tauber "something must be done to change perceptions that educators lack any special expertise. This perception had a negative affect on how pupils, administrators and the public, and these negative perceptions also influence how educators feel about themselves, about one another, and their profession" (1992, p.98). EFA (2005) argues for the provision of basic sanitation, a sound infrastructure and other facilities to make schools safe and welcoming. The condition of schools was identified by teachers as one of the sources of job satisfaction.

Recommendation: *As there are many sources of teacher dissatisfaction in Mozambique such as the career path of teachers through promotion and their level of salary, it is suggested that the Ministry looks at offering alternative benefits to teachers. Previously, and in other countries, social benefits such as housing, health, education, travel and recreation were offered to teachers in lieu of major salary increases. Such a scheme could work in addressing issues of dissatisfaction identified in the SACMEQ study.*

10. Gender has a differential effect on reading and mathematics across SACMEQ countries.

On average, girls performed better in reading (505.1) than boys (494.6 p=.000) and boys performed slightly better in mathematics (501.7) than girls (498.1 p = .044) in SACMEQ countries. In Mozambique boys achieved 518.4 and girls 514.1 in reading, and in mathematics boys performed better (537) than girls (519.5 p = 000). However, exceptions were found in Lesotho, Malawi, Mozambique, Tanzania and Zanzibar, where boys performed better in reading than girls. In the PIRLS studies (2000 and 2006) girls recorded significantly higher mean scores in reading than boys in all systems, a fact which Greaney and Kellaghan (2008, p.117) and Mullis, Martin and Kennedy (2007) confirmed in PIRLS (2001 and 2006). In Botswana, Lesotho, Mauritius, Seychelles and South Africa, girls performed better in mathematics than boys. A similar result was found in the TIMSS study by Greaney and Kellaghan who state that "Overall, gender differences in mathematics achievement were negligible. Girls, however, outperformed boys in some systems, while boys did better in other systems" (2008, p.114).

11. Pupils with a higher socio-economic status performed better than pupils with a lower socio-economic status across SACMEQ countries.

Pupils with a higher SES performed better than pupils with a low SES (510.5; 523 p = .000) in reading and in mathematics (532.6; 527.5; p = 012) in the SACMEQ countries. On average, pupils with a low SES had 482.4 points in reading and 486 points in mathematics, while pupils with a high SES had significantly higher scores, with 519.9 points in reading and 515.2 points in mathematics. The exception is Lesotho, where pupils with a low SES performed better in mathematics (448.6) than pupils with a high SES (444.9). In various studies (Dustmann, Rajah andSoest, 1998; Epstein,1988 in Gold and Miles, 1981; Howie, 2002; Kotte, Lietz and Lopez, 2005), researchers emphasise the relationship between pupils' background and their performance. In addition, EFA (2) (2005) stress that pupils' socio-economic status is very influential in determining achievement in all contexts.

Recommendation: *EFA (2) (2005) and other studies show that the impact of pupils' socio-economic status can be partly offset by a better school climate. It is recommended that the training of teachers is improved, that in-service training is continued, that there is provision of stronger support to teachers, and additional school resources, especially textbooks, needs to be considered by the Ministry to address this particular issue. In addition, the community can become more involved in the running and supporting of the school and its pupils.*

12. Across SACMEQ countries on average, pupils from large towns performed better than pupils from smaller towns and rural or isolated areas.

On average, pupils from isolated/rural areas in the SACMEQ countries had a mean of 482 points in reading; those from small towns had a 508.9 mean while pupils from large towns had a 540.7 mean (p=.000). In mathematics, pupils from isolated/rural areas had a 487.4 mean, their peers from small towns had a mean of 507.7 and for those from large towns, a mean of 526.7 was achieved (p = 000).

Mozambique pupils showed a similar pattern in both reading and mathematics. Pupils from large towns (533.3) performed better in reading than pupils from small towns (510.5) and isolated or rural areas (502.3; p = .000) and in mathematics pupils from large towns performed better than pupils from small towns 536.7; and 527.5 and isolated or rural areas (524; p = 000).

Using the SACMEQ data archive, Zhang's (2006) analysis found that in some SACMEQ countries rural pupils not only lagged behind their counterparts in reading ability but that their school conditions, which are important to academic success in general, compared unfavourably. Pupils from rural areas generally belong to families with a lower SES and tend to have less home support for their academic work. In addition, rural students tend to be older than their urban counterparts, as a result of late entry into the school system, a higher incidence of Grade repetition, or a combination of both. In addition to the poor condition of their facilities, schools in rural areas have fewer instructional resources, fewer facilities, and the teachers in those schools have lower reading scores.

Recommendation: *To address the gap between education in urban and rural areas the Ministry of Education and Culture needs to implement a holistic plan to improve the quality of teaching and aim for greater equity. In order to develop equity, the lack of school resources, the infrastructure and the quality of teacher training and continued support of in-service teachers should be addressed. Consideration also needs to be given to the SES of both the teachers and the pupils in rural areas, and so it is recommended that in such areas, an upliftment programme involving the community and NGOs be implemented to address this issue*

13. The availability of school resources is important for pupils' success in reading and mathematics in SACMEQ countries.

School resources are predictors of pupil performance in reading and mathematics in SACMEQ countries. In less developed countries, there is a relationship between the school's location, the external teaching context (school resources), and the internal teaching context (textbooks and school material). Chowdhury (1995) identifies three major problems related to the school's location. Firstly, the lack of physical access to the school; secondly, the quality of the infrastructure as well as the school equipment, especially in rural areas; and thirdly, the quality of the schooling, which is also an important determinant of participation and retention. These findings confirm what was found in EFA (2005) that most studies in developing countries suggest that cognitive achievement increases as school expenditure, teacher education and school facilities are enhanced. Fuller (1987) also found that resources were more important determinants of student achievement in developing countries than in industrialized countries. Fuller and Clarke (1994) reinforce this conclusion. In addition, EFA (4) (2005) argues that learning materials strongly affect what teachers can do. Zhang's (2006) study, referred to before, confirms the relationship between SES, school resources, school condition and school location (see Chapter 7, Figures 7.16 and 7.18).

Recommendation: *The Ministry of Education and Culture in Mozambique should focus attention on rural schools and find the mechanisms to reduce the impact of pupils' low socio-economic status, school conditions and the lack of school resources, which could contribute to low pupil performance. One possible way to address these factors is for such rural schools to be attached to or associated with companies and NGOs or schools in large or small towns, which could then contribute to and assist in developing them.*

14. Parent and community involvement is important for pupil performance in reading across SACMEQ countries.

Community involvement appears as a predictor in reading and in mathematics in the SACMEQ countries. The role of parents in pupil performance is described in the literature as one of the variables that makes a difference. Students develop personally and academically if their families emphasize schooling, particularly if they let their children know they are interested, and do so continually over the years (Epstein, 1988 in Gold and Miles, 1981). Another important variable that makes a difference to pupil performance is the level of parents' education, especially the education levels of the mother, as no maternal education is an important determinant of pupils' enrolment as well as of pupils' performance, especially for girls, as confirmed by Chowdhury (1995). The reason for low parent involvement might be ascribed to the low literacy rate in rural areas.

***Recommendation*:** *The Ministry of Education and Culture in Mozambique should ensure that the commission/committee of the school community plays an active role in supporting schools, both in urban and in rural areas. The involvement of the community in schools could help solve some of the daily problems that schools face such as maintaining school buildings and monitoring the* *conditions in schools, implementing a disciplinary policy, a homework policy, and addressing teacher and pupil absenteeism. The implementation of literacy and numeracy programmes for parents has occurred in Mozambique to improve the level of parents' education.*

The aim of the next section is to propose further studies for a deeper understanding of pupil performance.

10.4 CONCLUSIONS AND RECOMMENDATIONS REGARDING THE RESEARCH AND FURTHER STUDIES

Taking into consideration the results of this study, the purpose of this section is to propose some themes for further research designed to understand the reasons for low pupil performance in reading and in mathematics in some SACMEQ countries. The two investigations proposed relate to undertaking another secondary study using the SACMEQ data and a different study investigating the methodology used in the teaching of reading and writing skills in primary education.

1 – There is a need for further cross-national studies using the SACMEQ database

The use and analysis of the SACMEQ cross-national database provides the Ministries of Education of the SACMEQ countries with sound data to inform the development of teaching and learning in schools. Examples of kinds of such information are:

a) pupil performance in reading in different types of texts:

Narrative prose: *Continuous texts in which the writer aims to tell a story – whether this be fact or fiction;*

Expository prose: *Continuous text in which the writer aims to describe, explains, or otherwise conveys factual information or opinion to the reader; and*

Documents: *Structured information organized by the writer in a manner that requires the reader to search, locate, and process selected facts, rather than to read every word of a continuous text.*

b) pupil performance in mathematics in different types of numeracy:

Number: *Operations and number line, square roots, rounding and place value, significant figures, fractions, percentages, and ratios.*

Measurement*: Measurements related to distance, length, area, capacity, money, and time; and*

Space-Data: *Geometric shapes, charts (bar, pie, and line), and tables of data.*

These studies can contribute to identifying the areas where pupils present difficulties. The results of the study can be useful for curriculum planners to improve strategies for teaching, for those who write primary school textbooks, as well as for teaching and learning.

2 – There is a need for a further study emanating from the results of SACMEQ

The high percentage of pupils performing only between Levels 1 and 3 in reading and mathematics has far-reaching implications in terms of the internal and external efficiency of the education system. The quality is low, and pupils who performed at these levels cannot proceed to higher levels of schooling. This poor performance has implications for the acquisition and development of initial reading, writing and numeracy skills, which are aimed at Grade 1 and 2 in the case of Mozambique.

Where pupils perform in or under Level 3, the Ministries of Education of those school systems should conduct two kinds of research studies:

a) One study should assess primary education and incorporate an investigation into:

- The level of teachers' knowledge of reading, writing and numeracy skills methodology.
- How teachers implement the methodologies which enable pupils to learn reading, writing and numeracy skills.
- How textbooks implement the methodology to learn reading, writing and numeracy skills.
- How teachers prepare pupils to learn reading, writing and numeracy skills.

The purpose of such a study would be to identify the major difficulties that pupils encounter in learning reading, writing and numeracy skills, and to evaluate the level of teachers' knowledge of the methodology.

b) The other study should assess all teacher training processes with a focus on the methodology of teaching reading, writing and numeracy skills, including:

- ❖ The curriculum for teacher training.
- ❖ Trainers' profiles.
- ❖ Modules in teacher training colleges.
- ❖ Teachers' profiles at Annexe schools.
- ❖ Pedagogical practices at primary school level.
- ❖ Textbooks and subject teacher guides in primary school.

10.5 CONCLUSION

Dealing with the role of the teacher in pupil performance, which is emphasized by many researchers, such as Chapman and Mählck (1997), Châu (1996), Darling-Hammond (1999) and Kanu (1996), this study is intended to be a modest contribution made to the Ministries of Education in SACMEQ countries, although it has particular relevance for the Ministry of Education and Culture in Mozambique. This contribution is made in the knowledge that the Ministry has conducted few studies in upper primary school related to the pupils' and teachers' performance, and in the knowledge that Mozambique, as a Portuguese-speaking country, has a unique history, tradition and system of education different from that of any others of the countries that participated in the SACMEQ study.

A comparative analysis using a cross-national study is important for the Ministry of Education and Culture in order to have an overview of the performance of teachers and pupils in other school systems within the SACMEQ countries. By identifying the weaknesses and the strengths in each system, all SACMEQ countries can learn from one another. However, the results of this thesis` should be used with caution, taking into consideration the history, location, economy and culture of each country.

SACMEQ II is one of the few known research projects that carried out a cross-national study in Mozambique using a truly representative sample. Generally, the studies carried out in the field of education in Mozambique are restricted in scope and do not employ truly representative national data. SACMEQ provided valid and reliable data on which important decisions could be based. Specifically, SACMEQ II provided relevant, high-quality data about the academic profile of teachers, the level of performance in the areas assessed, school management, and other factors that are relevant for policy making.

Many benefits are apparent within the educational context of the region. The data collected through SACMEQ II can be considered to be of extreme importance for Mozambique's education system, since it provides the country with important data to promote a reflection on its primary education sector, to identify the position of Mozambique's education system within the region, and to work towards its improvement.

The Ministry of Education and Culture in Mozambique focuses very strongly on increasing access and educational opportunities for all Mozambicans at all levels of the education system. At the same time, the quality of education in Mozambique is constantly being improved, and institutional and financial frameworks are developed that will sustain Mozambican schools and pupils in the future (MINED, 1998). Although school conditions and the various resources are essential to the overall results achieved by pupils, the quality of the teachers is of paramount importance to the performance of pupils.

The challenge facing the education system in Mozambique is therefore not only to improve school conditions and to ensure the availability of resources, but to deliver quality teachers, thereby entrenching quality in education.

REFERENCES

Abadzi, H.; Crouch, L.; Echegaray, M.; Pasco, C. and Sampe, J. (2005) *"Monitoring Basic Skills Acquisition though Rapid Learning Assessments: A Case Study from Peru,"* in *Prospects*, Vol. 35, no. 2. June 2005, pp.137-156. In World Bank Independent Evaluation Group. (2006).

Abagi, O. and Odipo, G. (1997). Efficiency of primary education in Kenya: Situational analysis and implications for educational reform. Kenya: The Institute of Policy Analysis and Research.

Aggarwal, Y. (2000). Quality Concerns in Primary Education in India. Where is the Problem? In *Education Commission,* (pp.1-17).

Alberto, A. e Mahumane, G. (2000). *Avaliação do projecto Ligação Escola Comunidade*. Maputo: Ministério da Educação.

Almeida, A.M. (1973). *Panorama da Educação em Moçambique 1973*. Lourenço Marques: Secretário Provincial de Educação. Imprensa Nacional de Moçambique.

Anderson, L.W. (1991). *Increasing teacher effectiveness, fundamentals of educational planning*. Paris: International Institute for Educational Planning - UNESCO.

Arnold, 1998 in Howie, 2002

Bacchus, M. (1991). *Improving the quality of basic education through curriculum development and reform. Commonwealth Policy Paper on curriculum reform.* London: Commonwealth Secretariat.

Balói, O. e Palme, M. (1995). *Vocação ou Exclusão: Um estudo sobre o professor primário recém formado. Caderno de Pesquisa Nº 11.* Maputo: INDE - Ministério da Educação.

Barnett, R. (1994). *The limits of competence: knowledge, higher education and society Buckingham.* UK: Open University Press.

Beaton E., Mullis, I., Martin, M., Gonzalez, E., Kelly, D. and Smith T. (1996). *Mathematics achievement in the middle school years: IEA'S Third International Mathematics* and *Science Study (TIMSS).* Boston: TIMSS International Study Center Boston College.

Becker, G.S. (1981). *A treatise on the family.* Cambridge: Harvard University Press.

Ben-Peretz, M. (1994). Teacher preparation, conception of teaching, evaluation: alternative policies. In Husén, T. and Postlehwaite, T.N. (eds). *The International Encyclopaedia of Education* 2nd Edition. Vol. 10 (pp. 6035-6092). Oxford: Pergamon.

Ben-Peretz, M. (1995). *Curriculum of teacher education programs*. In L. W. Anderson (Ed.), International encyclopedia of teaching and teacher education (pp.543–547). Oxford: Elsevier Science/Pergamon.

Bloom, B.S.; Engelhardt, M.D; Frurst, E.J.; Hill, W.H and Krathworl, D.R. (1956).Taxonomy of Educational Objectives The classification of educational goals: Handbook I: Cognitive Domain New York: David McKay.

Bloom, B.S., Krathwohl, D.R. and Masia, B.B. (1964). Taxonomy of educational objectives. In The classification of educational goals Handbook II Affective Domain. New York: David McKay.

Boehme, D., Chiau, S., Matevele, C. and Otto, H. (1991). *O desperdício Escolar no 1º Grau do Ensino Primário na Cidade de Maputo*. Maputo: INDE - Ministério da Educação.

Bond, T. and Fox, C. (2007). *Applying the Rasch model: Fundamental Measurement in the human science*. Mahwah, New Jersey: Lawrence Erlbaum.

Boone, W.J. and Rogan, J.M. (2005). Rigour in quantitative analysis: The promise of Rasch analysis techniques. In *African Journal of Research in SMT Education,* 9(1), (pp.25-38).

Botha, R. J. and Hite, S. J. (2000). Outcomes-based education and quality: cursory remarks about a possible relationship. In *Educare* l(29), (pp.129-141).

Byamugisha, A. and Ssenabulya, F. (2005). *The SACMEQ II project in Uganda: A study of the conditions of schooling and the quality of education.* Harare: SACMEQ.

Carr, M. (2006). Policy report – The determination of student achievements in Ohio's public schools. Education Policy Director. Ohio: Buckye Institute for Public Policy Solutions.

Chapman, D.W. and Mählck, L.O. (1997). Changing what happens in schools: Central level initiatives to improve school practice. In Chapman, D.W., Mählck, L.O. and Smulders, A. (eds) *From Planning to Action: Government Initiatives for Improving School Level Practice.* Paris: International Institute for Educational Planning-UNESCO.

Chatterjee, S., and Hadi, A.S. (2006). *Regression analysis by example*. 4th Edition. New Jersey: Wiley and Sons.

Châu, G. (1996). *The quality of primary schools in different development contexts.* UNESCO: International Institute for Educational Planning.

Cheng Yin C. and Tsui Kwok T. (1996). Total teacher effectiveness: new conception and improvement in *International Journal of Educational Management* 10(6), (pp.7-17).

Cheng Yin C. and Tsui Kwok T. (1998). Research on total teacher effectiveness: conception and strategies. In *International Journal of Educational Management* 12(1), (pp.39-47).

Chimombo, J., Kunje, D., Chimuzu, T., and Mchikoma, C. (2005). *The SACMEQ II Project in Malawi: A Study of the Conditions of Schooling and the Quality of Education*. Harare: SACMEQ.

Chowdhury, K. (1995). *Literacy and Primary Education*. Available at http:www.worldbank.org.innopac.up.ac.za:/html/extdr/hnp/hddflash/workp/docs/wp00050 (accessed on 19.04.07).

Christensen, S. L., Rounds, T., and Gorney, D. (1992). Family factors and student achievement: An avenue to increase student success. In *School Psychology Quarterly*. 7, (pp.178-206).

Cockburn, A.D. (2000). Elementary teachers' needs: issues of retention and recruitment. In *Teaching and Teacher Education.* 16, (pp.223-238). Available at www.elsevier.com/locate/tate (accessed 07.05.08).

Creighton, D. C. (1997). Critical literacy in the elementary classroom. In *Language Arts*. 74, (pp.438-448).

Creswell, J.W. (2002). *Educational research: planning, conducting and evaluating quantitative and qualitative research.* Upper Saddle River, NJ: Pearson.

Creswell, J.W. (2003). Research design: Qualitative, quantitative and mixed methods approaches. 2nd Edition. Thousand Oaks: Sage.

Darling-Hammond, I. (1999). Teacher quality and student achievement: A review of state policy evidence. In *Education policy analysis archives*, 8(1), (pp.1-40).

Department of Education. (1996). Committee on Teacher Education Policy (COTEP). *Norms and Standards and for Teacher Education,* 3rd Edition. Pretoria: Department of Education.

DoE (1996). See Department of Education (1996).

Dewey, J. (1938). *Logic: The Theory of Inquiry.* New York: Hold Rinehart and Winston.

Dimmock, C. (1990). Managing for quality and accountability in Western Australian Education. In *Educational Review.* 42 (2), (pp.197-206).

Direcção do Ensino Basico. (1996). *Curriculo para os Institutos do Magistério Primário. Maputo:* Ministério da Educação.

Direcção de Planificação. (2001). *Estatística da Educação Aproveitamento Escolar 2002.* Maputo*:* Ministério da Educação.

Dolata, S., Ikeda, M. and Murimba, S. (2004). Different pathways to EFA for different school systems. In *IIEP newsletter*, 22(1), (pp. 8-9). http://www.sacmeq.org/SACMEQ%20II/F/NleJan2004pp8-9.pdf (accessed 12.05.08).

Dolata, S. (2003). Different ways of looking at SACMEQ II Pupil Test Scores. Part 1: test score means and variations in test scores. In Murimba, S. and Nzomo, J. *Cross-national results from the SACMEQ II project*. Paris: International Institute for Educational Planning - UNESCO.

Donaldson, G. (2005). *Improving achievement in mathematics in primary and secondary schools*. HMIE Improving series. Available: http:// www.**hmie**.gov.uk/documents/publication/iampss.html (accessed 15.05.09).

Dunkin, M.J. (1997). *Assessing teacher's effectiveness.* In *Educational Research*. 7(1), (pp.37-51).

Dustmann, C., Rajah, N. and Soest, A. (1998). *School quality, exam performance, and career choice*. Available http//arno.ovt.nl/show. (accessed 09.05.08).

Dzvimbo, K. P. and Lima, J. C. (1994). *Teacher education and education For All. A study of the middle pedagogical institutes and their potential role in in-service teacher education.* Maputo: Ministry of Education.

Ehiametalor, E. (1985). Primary school principals' performance in critical administrative task areas. In *The Journal of Negro Education*. 54(4) (Autumn), (pp.566-574).

Elley, W. B. (1992). *IEA study of reading literacy: How in the World do Students Read?* The Netherlands: The International Association for the Evaluation of Educational Achievement.

Eraut, M. (1994). *Developing Professional Knowledge and Competence*. Washington D.C.: Falmer Press.

Etsey, K. (2005). *Causes of Low Academic Performance of Primary School Pupils in the Shama Sub-Metro of Shama Ahanta East Metropolitan Assembly (SAEMA).Ghana*. Regional Conference on Education in West Africa Dakar, Senegal. (pp.1-34). University of Cape Coast, Ghana: Department of Educational Foundations.

Evans, L. (1997). Understanding teacher morale and job satisfaction. In *Teaching and Teacher Education.* 13(8), (pp.831-845).

Farrell, J. P. (1989). International Lessons for School Effectiveness: The view from the developing world. In Holmes, M. et al. (Eds.) *Educational Policy for Effective Schools*. Toronto, Ontario: Institute for Studies in Education.

Fehrler, S., Michaelowa, K., and Wechtler, A. (2006). *The cost-effectiveness of inputs in primary education: insights from recent student surveys for Sub-Saharan Africa.* Available: http:// www.ifw-kiel (accessed 12.05.08).

Fraser, H., Draper, J., and Taylor, W. (1998). The quality of teachers' professional lives: Teachers and job satisfaction - Evaluation and research. In *Education*. 12(2), (pp.61-71).

Fraser, W. J. (2000). Let's revisit competence-based teacher education. In EDUCARE 29 (1&2), (pp.50-71).

Fuentes, L.C. and Nieto, J.M.S. (2005). *Evaluation model for pre-primary education Ministry of Education and Science.* Madrid: National Institute for Evaluation and Quality of the Education System.

Fuhrman, S.H. (1991). *Designing coherent education policy: Improving the system.* New York: MacMillan.

Fullan, M. (2001). The New Meaning of Educational Change 3rd Edition. New York: Teacher College, Columbia University.

Fullan, M. and Watson N. (1999). *School-based management: Reconceptualizing to improve learning outcomes. (*Final Paper prepared for The World Bank) Ontario Institute for Studies in Education: University of Toronto.

Fuller, B. and Clarke, P. (1994). Raising school effects while ignoring culture? Local conditions and the influence of classroom tools, rules, and pedagogy. In *Review of Educational Research*. 64(1), (pp.119-157).

Fuller, B. (1987). What school factors raise achievement in the third world? In *Review of Educational Research*. 57(3), (pp.255-292).

Fwu, B. and Wang H. (2002). From uniformity to diversification: transformation of teacher education in pursuit of teacher quality in Taiwan from 1949 to 2000. In *International Journal of Education Development*. 22(2), (pp.155-167).

Garden, R. (ed.) (1997). *Mathematics and Science performance in middle primary school*. Wellington, New Zealand: Research and international Section Ministry of Education.

Glasman N.S. and Heck R.H. (2003). Principal Evaluation in the United States Academic Publishers. In Kellaghan, T.E. and Stufflebeam, D. L. (eds.) International handbook of educational evaluation (pp.643-670). Dordrecht: Kluwer Academi Publishers.

Gold, B.A. and Miles, M.B. (1981). The Parent and The Community. Whose school is it, anyway? In M. Fullan. *The New Meaning of Educational Change* 3rd Edition. New York: Teacher College, Columbia University.

Goldstein, H. (1995). *Interpreting international comparisons of student achievement.* Paris: UNESCO.

Goldstein, H. (2001). Using Pupil Performance Data for Judging Schools and Teachers: Scope and Limitations. In *British Educational Research Journal*. 27(4), (pp.433-442).

Golias, M. (1991). *Formação de Professores Primários: Balanços e Perspectivas.* Documento apresentado no 1º Seminário das Instituições de Formação de Professores. CRDS – Maputo de 8-13 de Abril. Maputo: Ministério da Educação.

Gorard, S. and Smit, E. (2004). *An international comparison of equity in education systems. In Comparative Education. 40(1),* (pp.15-28).

Grauwe, A. D. and Varghese, N. V. (2000). Improving School Efficiency issues and priorities Seminar Report. In *Improving School Efficiency: the Asia Experience*. Paris: International Institute for Educational Planning - UNESCO.

Greaney, V. and Kellaghan, T. (2008). *Assessing National Achievement Levels in Education.* Washington: World Bank.

Grift, W. and Houtveen, A. (1999). Educational leadership and pupil achievement in primary education. In *School effectiveness and school improvement*. Vol. 4, (pp.373-389).

Grisay, A., and Griffin, P. (2004). *What's behind the acronyms (IEA, PISA, SACMEQ, TIMSS, etc.)?* IIEP-InWEnt Policy Forum on "Cross National Studies of Quality of Education: Planning their Results and Managing their Impact" 17-18 June 2004. Paris: International Institute for Educational Planning - UNESCO.

Gronlund, N.E. (2000). *How to write and use instructional objectives.* (6th edition). New Jersey. Saddle River.

Grossman, P. L. (1995). *A psychological view of teacher - teachers' knowledge*. In The International Encyclopaedia of Teaching and Teacher Education. 2nd Edition. (pp.20-24). Columbia, SC: University of South Carolina.

Guro, M.Z. (1997). *Os Estudantes dos Centros de Formação dos Professores Primários em Moçambique. Cadernos de Pesquisa nº 29*. Maputo: Ministério da Educação.

Haegeland,T; Raaum, O; and Salvanes, K. (2005). Pupil achievement, school resources and family background. IZA Discussion Paper No. 1459. Available at SSRN: http://ssrn.com/abstract=648059 (accessed 15.05.09).

Hargreaves, A. and Fullan, M. (eds). (1992). *Teacher instruction in Britain and Australia and teacher education in USA and Canada.* New York: Teacher College Press, Colombia University.

Hargreaves, A. and Fullan, M. (eds). (1992). *Understanding teacher development.* New York: Teacher College Press, Colombia University.

Hauenstein, A.D. (1998). *A conceptual framework for educational objectives: A holistic approach to traditional taxonomies*. Lanham, MD: University Press of America.

Heyneman, S.P. and Loxley, W. A. (1983). *The effect of primary-school quality on academic achievement across twenty-nine high-and low-income countries. In The American Journal of Sociology,* 88(6) (pp.1162-1194).

Howie S. (2002). *English language proficiency and contextual factors influencing mathematics achievement of secondary school pupils in South Africa.* Doctoral Thesis: University of Twente, Enschede.

Howie, S. and Plomp, T. (eds). (2005). Evaluating students' achievements within different contexts. In *Prospects*. XXXV(1).Paris: International Bureau of Education. UNESCO.

Hughes, P., Chapman, J.A. and Williamson, J.C. (2001). Competencies in the classroom: deconstructing teacher experiences. In *Education Research and Perspectives*. 28(1), (pp.1-24).

INE (1996) see Instituto Nacional de Estatística. (1996).

INE (2008) see Instituto Nacional de Estatística. (2008).

Instituto Nacional de Estatística. (1996). *Projecções actualizadas (1997-2015).* Maputo: Ministério do Plano.

Instituto Nacional de Estatística. (2005). *Inquérito à Força do Trabalho (IFTRAB 2004-2005).* Maputo: Ministério do Plano.

Instituto Nacional de Estatística. (2008). *Resultados Preliminares do Senso de 2007*. Maputo: Ministério do Plano.

Kanu, Y. (1996). Educating teachers for the improvement of the quality of basic education in developing countries. In *International Journal of Educational Development*. 16(2), (pp.173-184).

Keitheile, M. and Mokubung, M. (2005). *The SACMEQ II Project in Botswana: A study of the conditions of schooling and the quality of education.* Harare: SACMEQ.

Kibler, R. J., Cegala, D.J., Barker, L.L. and Miles, D. (1974). *Objectives for instruction and evaluation*. Boston. Allyn and Bacon, Incorporated.

Kline, P. (2003). *Personality and individual differences***.** The handbook of psychological testing. London: Routledge.

Kotte, D., Lietz, P. and Lopez, M.M. (2005). Factors influencing reading achievement in Germany and Spain: Evidence from PISA 2000. In *International Education Journal.* 6(1), (pp.113-124).

Kulpoo, D. (1998). *The quality of education: Some policy suggestions based on a survey of schools. SACMEQ Policy Research No.1. Mauritius*. Paris: IIEP.

Kulpoo, D. and Soonarane, M. (2005). *The SACMEQ II Project in Mauritius: A Study of the conditions of schooling and the quality of education.* Harare: SACMEQ.

Langer, J.A. (1995). *Envisioning literature*. Newark, DE: International Reading Association.

Lee, V., Zuze, T. and Ross, K. (2005). School effectiveness in 14 sub-Saharan African Countries: Links with 6th Graders' Reading Achievement. In *Studies in Educational Evaluation* 31, (pp.207-246).

Leste, A., Valentin, J. and Hoareau, F. (2005). *The SACMEQ II Project in Seychelles: A study of the conditions of schooling and the quality of education*. Harare: SACMEQ.

Lundberg, I. and Linnakyla, P. (1993).*Teaching Reading Around the World*. Hamburg: The International Association for the Evaluation of Educational Achievement.

MacDonald, D. (1999). Teacher Attrition: A Review of Literature. In *Teaching and Teacher Education.* 15, (pp.835-848).

Macnab, D. (2000). *Raising standards in mathematics education: values, vision, and TIMMS*. In *Educational Studies in Mathematics* 42, (pp.61-80).

Makuwa, D. (2005). *The SACMEQ II Project in Namibia: A study of the conditions of schooling and the quality of education.* Harare: SACMEQ.

Malaty, G. (2006). *What are the reasons behind the success of Finland in PISA*? *Gazette des Mathématiciens*, 108, (pp.59-66).

Martin, M., Mullis, I. and Kennedy, A. (2007). PIRLS 2006 Technical report November 2007 Kennedy (Eds.) PIRLS, 2006**.** *timss.bc.edu/isc/publications.html*

Martins, Z. (1992). *Aproveitamento Escolar no Sistema Nacional de Educação - Contribuições para um estudo das disparidades regionais e de sexo com referência ao EP1 Cadernos de Pesquisa nº 1.* Maputo: INDE Ministério da Educação.

MEC (1980) see Ministério da Educação e Cultura. (1980).

MEC (2006) see Ministério da Educação e Cultura - Direcção de Planificação. (2006).

Medley, D.M. and Shannon D.M. (1994). Teacher Evaluation In Husén, T. and Postlethwaite, T.N. (eds). The International Encyclopedia of Education, 2nd Edition. Vol.10, (pp.6015-6020). Oxford: Pergamon.

Medley, D.M. (1982). Teacher Effectiveness. In Mitzel, H.E. (ed.) *Encyclopaedia of Educational Research,* 5th Edition. New York, NY: The Free Press.

Mendenhall, W. and Sincich, T. (1996). *A second course in statistics regression analysis,* 5th Edition. Upper Saddle River, NJ: Prentice-Hall.

Mendes, M.L.S., Neves, M.M. and Guedes, M. (2000). *The Early Childhood Education and Care Policy in Portugal*. Portugal: Ministry of Education.

Miguel, M.M. and Barsaga, B.E. (1997). Multi-grade schooling in the Philippines: a strategy for improving access to and quality of primary education – From Planning to Action: Government initiatives for improving school-level practice. Paris: International Institute for Educational Planning - UNESCO.

MINED, (1998) see Ministry of Education (1998).

MINED, (2001) see Ministério da Educação - Direcção de Planificação (2001).

Mingat, A. (2003). Options for a cost-effective allocation for resources. In Verspoor, A. M. (ed.). *The Challenge of Learning: Improving the Quality of Basic Education I Sub-Saharan Africa* (pp.107-137). Document presented at the 2003 ADEA Biennial Meeting Grand Baie, Mauritius, December 3-6, 2003.

Ministério da Educação e Cultura. (1980). *Projecto de Ligação Escola Comunidade*. Maputo: Ministério da Educação e Cultura.

Ministério da Educação e Cultura - Direcção de Planificação. (2006). *Estatística da Educação – Levantamento Escolar 2005.* Maputo: Ministério da Educação e Cultura.

Ministério da Educação - Direcção de Planificação. (2001). *Estatística da Educação – Levantamento Escolar 2000.* Maputo: Ministério da Educação.

Ministério da Educação - Direcção de Planificação. (2003). *Estatística da Educação – Aproveitamento Escolar 2002*. Maputo: Ministério da Educação.

Ministério do Plano e Finanças e Direcção Nacional de Estatística Gabinete Central do Recenseamento. (1995). *Moçambique: Panorama Demográfico e Sócio-Económico Série: Inquérito Demográfico Nacional Documento nº 5*. Maputo: Ministério do Plano e Finanças.

Ministry of Education. (1998). *Education sector strategic plan 1999-2003. "Reviving schools and expanding opportunities"* Maputo: Ministry of Education.

Ministry of Education. (1996). *Educating our future*. Lusaka, Zambia: Ministry of Education.

Ministry of Education and Culture. (1993). *Toward Education for All: A development brief for education, culture and training* .Windhoek: Gamsberg Macmillan.

Ministry of High Education. (2003). Learning-centred education in the Namibian context. A conceptual framework. Namibia: NIED - Ministry of High Education.

Ministry of High Education, Vocational Training, Science and Technology and Ministry of Basic Education and Culture NIED (1998). T*he Basic Education Teacher Diploma (BETD). Broad Curriculum*. Namibia:NIED

Moloi, M. and Strauss, J. (2005). *The SACMEQ II Project in South Africa: A study of the Conditions of schooling and the quality of education.* Harare: SACMEQ.

Monk, D.H. and Ibrahim, M.A. (1984). Patterns of Absence and Pupil Achievement. In *American Educational Research Journal.* 21(2) Summer, (pp.295-310).

Mothibeli, A. and Maema, M. (2005). *The SACMEQ II Project in Lesotho: A study of the Conditions of schooling and the quality of education.* Harare: SACMEQ.

Mrutu, A., Ponera, G., and Nkumbi, E. (2005). *The SACMEQ II Project in Tanzania: A study of the conditions of schooling and the quality of education.* Harare: SACMEQ.

Mullis, I., Martin, M., Beaton, A., Gonzalez, E., Kelly, D. and Smith, T. (1997). *Mathematics achievement in the primary school years: IEA's Third International Mathematics and Science Study* (TIMSS) .Chestnut Hill, MA: Boston College.

Mullis, I., Martin, M., Gonzalez, E. and Kennedy, A. (2003). *PIRLS 2001 International Report: IEA's Study of Reading Literacy Achievement in Primary Schools in 35 Countries*. Chestnut Hill, MA: Boston College.

Mullis, I., Kennedy, A., Martin, M. and Sainsbury, M. (2004). PIRLS 2006 *Assessment Framework and Specifications*. Chestnut Hill, MA: Boston College.

Murimba, S. (2005). The Southern and Eastern Africa Consortium for Monitoring Educational Quality (SACMEQ): Mission, Approach and Prospects. In *Prospects* 35 (1), (pp.75-89).

Murimba, S. and Nzomo, J. (2003). *Cross-national results from the SACMEQ II project*. Paris: International Institute for Educational Planning - UNESCO.

Murphy J. (1993).What's in? What's out? American education in the nineties. In *Phi Delta Kappa*. April, (pp.641-647).

Myint, S. (1999). Japanese beginning teacher, perception of their preparation and professional development. In *Journal of Education for Teaching*, 25(1), (pp.17-29).

Nassor, S., Abdallah, M., Said Ali, O. and Salim, M. (2005). *The SACMEQ II Project in Zanzibar: A study of the conditions of schooling and the quality of education*. Harare: SACMEQ.

Norris, N. (1991), *The Trouble with competence. In Cambridge Journal of Education* 21 (3), (pp.331-341).

Onsumu, E., Nzomo, J. and Obiero, C. (2005). *The SACMEQ II Project in Kenya: A study of the conditions of schooling and the quality of education*. Harare: SACMEQ.

Otto, H., Boehme, D. and Schafer, B. (1993). *A prática do processo de ensino-aprendizagem na formação de professores do EP1*. Maputo: INDE - Ministério da Educação.

Papanastasiou, C. (2000). Internal and external factors affecting achievement in mathematics: some findings from TIMSS. In *Studies in Educational Evaluation*. Pergamon University of Cyprus: Pergamon. Available at www.elsevier.nl/stueduc (accessed 08.03.08)

Passos, A. (1995). *Pre-conditions for learning to read and write: a Mozambican case study*. Stockholm University: Institute of International Education.

Passos, A. (2007). Teacher competence and its effect on pupil performance in Mozambique and other SACMEQ countries – preliminary results Presentation to SACMEQ Assembly of the Ministers International Institute for Educational Planning – UNESCO, Paris

Passos, A.and Cabral, Z. (1989). *A formação dos professores do Ensino Primário do 1º grau e a sua actuação na escola e na comunidade em Moçambique*. Maputo: INDE - Ministério da Educação.

Passos, A., Nahara, T., Magaia, F. and Lauchande, C. (2005). *The SACMEQ II Project in Mozambique: A study of the conditions of schooling and the quality of education*. Harare: SACMEQ.

Passos, A., Navesse, A. and Chiau, S. (2000). *Avaliação Magistério Primário.* Maputo: INDE Ministério da Educação.

Passos, A. and Otto, H. (1992). *As Dificuldades de Aprendizagem de Leitura e Escrita*. Maputo: INDE- Ministério da Educação.

Pearlman, M.A. and Tannenbaun, R. (2000). *Teacher evaluation practices in the accountability era*. In Kellaghan, T., Stufflebeam, D. L. and Wingate, L.A. (Eds.), *International handbook of educational evaluation* (pp.609-641). Dordrecht: Kluwer Academi Publishers.

Popham, W.J. (1986). Teacher competency testing: The devil's dilemma. In journal of Negro Education, 55 (3) (pp.379-385).

Popham, W.J. (1997). What's wrong – what's right – with rubrics. In *Educational Leadership.* 55(2), (pp.72-75).

Postlethwaite, T.N. and Ross, K. (1992). *Effective schools in reading: implications for educational planners.* Hamburg, Germany: IEA.

Raudenbush, S., Eamsukkawat, S., Di-Ibor, I., Kamali, M. and Taoklam, W. (1993). On-the-job improvements in teacher competence: policy options and their effects on teaching and learning in Thailand. In *Educational Evaluation and Policy Analysis*. 15(3) Fall, (pp.279-297).

Raudenbush, S. W. and Willms, J.D. (1995) The estimation of school effects. Journal of Educational and Behavioral Statistics, 20 (4), (pp.307-335).

Reimers, F. (1997). Changing schools through participatory knowledge management in El Salvador: Can education systems learn? From Planning to Action: Government initiatives for improving school-level practice. Paris: International Institute for Educational Planning - UNESCO.

República de Moçambique. (1992). *Boletim da República I Série nº 19.* Maputo: República de Moçambique.

República Popular de Moçambique. (1985). *Sistema Nacional de Educação Lei.* Maputo: República Popular de Moçambique.

República Popular de Moçambique. (1983). *Boletim da República. I Série nº 12*. Maputo: República Popular de Moçambique.

Ross, K., Saito, M., Dolata, S., Ikeda, M. and Zuze, L. (2004). *Data Archive for the SACMEQ I and SACMEQ II Projects*. Paris: International Institute for Educational Planning - UNESCO.

SACMEQ (2004), see Ross, K., Saito, M., Dolata, S., Ikeda, M. and Zuze, L. (2004). *Data Archive for the SACMEQ I and SACMEQ II Projcets.* Paris: International Institute for Educational Planning – UNESCO.

Sambo, A. (1999). *O Estado, os Missionários e formação de professores em Moçambique. Um estudo de caso da Escola de Habilitações de Professores de Posto do Alvor, 1960-1976 Cadernos de Pesquisa nº 32*. Maputo: INDE-Ministério da Educação.

Sander, W.L. and Horn, S.P. (1998). Research findings from the Tennesse Value-Added Assessment System (TVASS) database: Implications for educational evaluation and research. In *Journal of Personnel Evaluation in Education*, 12, (pp.247-256).

Sedel, C. (2003). Setting the scene. In Verspoor, A. M. (ed.) *The Challenge of Learning: Improving the Quality of Basic Education I Sub-Saharan Africa* (31-51). Document presented at the 2003 ADEA Biennial Meeting Grand Baie, Mauritius, December 3-6, 2003.

Shabalala, J. (2005). *The SACMEQ II Project in Swaziland: A study of the conditions of schooling and the quality of education*. Harare: SACMEQ.

Shah, S. (1995). Organization and Curriculum Planning. The International Encyclopaedia of Teaching and Teacher Education -Second Edition (1995) Edited by Lorin W. Anderson - University of South Carolina, Columbia, SC, USA (pp.540-543).

Short, E.C. (1985). The concept of competence: Its use and misuse in education. In Journal of Teacher Education, 36 (2), (pp.2-6).

Shulman, L.S. (1986). Those Who Understand: Knowledge Growth in Teaching. In *Educational Researcher*, 15(2), (pp.4-14).

Shuttleworth, I. (1995). The Relationship between Social Deprivation, as Measured by Individual Free School Meal Eligibility, and Educational Attainment at GCSE in Northern Ireland: a Preliminary Investigation. In British Educational Research Journal. 21(4), (pp.487-504).

Sitoe, B. and Ngunga, A. (2000). *Relatório do II Seminário sobre a padronização da ortografia de Línguas Moçambicanas.* Maputo: Nelimo - Centro de Estudos das Línguas Moçambicanas Universidade Eduardo Mondlane.

Smith, L.I. (2002). A Tutorial on Principal Components Analysis. Available on http://www.cs.otgo.ac.nz (accessed on 08.04.08).

Smith, N.M. (1979). Allocation of time and achievement in elementary social studies. In *Journal of Educational Research.* 72(4), (pp.231-236).

SNE, (1985) see República Popular de Moçambique. (1985).

Steyn, G.M. (1999). Professional development: a key to school improvement. In *South Africa Journal of Education*. 19(1), (pp.206-213).

Stiorer, B. and Maybin, J. (eds). (1994). *Language, literacy and learning in educational practice*. Buckingham, England: Open University Press.

Stufflebeam, D. (2003). Personnel Evaluation. In *International Handbook of Educational Evaluation*. Part Two: Vol. 9, (pp.603-607). Dordrecht: Kluwer Academic.

Swarts, P. (2002). *The Policy Formation Process in Namibia from1990-2002: The Case of Teacher Education.* Namibia: NIED.

Summers, A. and Wolfe, B. (1977). Do schools make a difference? In *American Economic Review*, 67(4), (pp.639-652).

Tauber, R.T. (1992). Recognizing Teacher Expertise. In *NASSP Bulletin* 76(540), (pp.96-102).

Teaching and Educational Development Institute (2002). TEDI conference: *How to Assess Graduate Attributes?* The University of Queensland Australia. available at www.tedi.uq.edu.au/conferences/teach accessed (09.05.09).

Thorndike, R. (1973). *Reading comprehension education in fifteen countries*. New York: Halsted Press.

Tomlinson, P. (1995). Can Competence Profiling Work for Effective Teacher Preparation? Part I: general issues – Oxford Review of Education, Vol. 21 Nº 2, (pp.179-194).

Tomlinson, P. (1995).Can Competence Profiling Work for Effective Teacher Preparation? Part II: pitfalls and principles. In *Oxford Review of Education*, 21(2), (pp.299-325).

UNESCO (1973).O Ensino de Leitura vol.I Editora Estampa Lta. Lisboa Portugal.Vol.I 224.

UNESCO (1989). Convention on the right of the child http://portal.unesco.org/ accessed 09.05.08).

UNESCO - *Education for All* (*EFA)* (2005).*Global Monitoring Report*. Paris: UNESCO Available at http://portal.unesco.org (accessed 09.05.08).

UNESCO Institute for Statistics (2008). *A View Inside Primary Schools. A World Education Indicator (WEI) cross-national study.* Montreal: UNESCO Institute for Statistics.

Verspoor, A. M. (ed.) (2003). *The Challenge of Learning: Improving the Quality of Basic Education I Sub-Saharan Africa.* Document presented at the 2003 ADEA Biennial Meeting Grand Baie, Mauritius, December 3-6, 2003.

Vlaardingerbroek, B. and Taylor, T.G.N. (2003). Teacher education variables as correlates of primary science ratings in thirteen TIMSS systems. In *International Journal of Educational Development*. 23 (pp.429-438).

Warham, S. (1993). Reflections on Hegemony: Towards a model of teacher competence. In Educational Studies. 19(2), (pp.205-217).

Westera, W. (2001). Competences in Education: a confusion of tongues. In *Journal of Curriculum Studies*. 33(1), (pp.75-88).

Windham, J.P. (1997). Incentives for student learning achievement: incentives analysis and individual decision making in the planning of education. Paris: International Institute for Educational Planning - UNESCO.

Woodhouse, G. and Goldstein, H. (1988). Educational performance indicators and LEA League tables. In *Oxford Review of Education.* 14(3), (pp.301-320).

World Bank Independent Evaluation Group. (2006). *From Schooling Access to Learning Outcomes: An Unfinished Agenda. An Evaluation of World Bank Support to Primary Education*. Available at www.worldbank.org/ieg/education (accessed on 09.05.08)

Wyk, N. (2001). Preparing South African educators for school-family-community partnerships. In Educare 30 (1&2), (pp.115-139).

Wylie, C. (1997). At the centre of the web: The Role of the New Zealand primary school principal within a decentralized education system. Wellington: New Zealand. Available on www.nzcer.org.nz (accessed on 03.12.2008).

Zhang, Y. (2006). Urban-rural literacy gaps in Sub-Saharan Africa: The roles of socioeconomic status and school quality. In *Comparative Education Review*. 50(4), (pp.581-602).