

Policy Brief

Number 1 (August 2011)



Southern and Eastern Africa Consortium
for Monitoring Educational Quality

Trends in Achievement Levels of Grade 6 pupils in Mozambique

www.sacmeq.org

Introduction

This Policy Brief provides information about levels and trends in the reading and mathematics achievement of Grade 6 Pupils in Mozambique that participated in two large-scale cross-national research studies of the quality of education that were conducted by the 15 school systems involved in the Southern and Eastern Africa Consortium for Monitoring Educational Quality (SACMEQ).

Between 2000 and 2007 the Ministry of Education introduced policy changes aimed at improving the quality of education and addressing various concerns raised by general public.

The major changes were related to the abolishment of school fees in primary schools, the provision of free text books and the introduction of a new curriculum. The new curriculum contained ten innovations. Four of these innovations were based on curriculum restructuring and the other six innovations were based on the introduction of new subjects. These policy changes included: (a) new learning cycles in which the 7 primary school grades were divided into first cycle (Grades 1 and 2), second cycle (grades 3, 4 and 5) and third cycle (Grades 6 and 7).

Different types of assessments were introduced at the primary school level. External assessments were implemented at the end of each learning cycle. Also at Grade 2 a supplementary assessment was set by teachers from the Cluster of Schools. Similarly, at Grades 5 and 7 pupils had to sit for National Examinations delivered by the National Examination and Certification Council (NECE).

Another important aspect is related to the allocation of teachers. In the past, teachers specialised into the delivery of one particular subject. Therefore, upper primary school pupils who attended lessons on seven or eight school subjects were taught by seven or eight specialised teachers. After the policy changes, the number of teachers was reduced to a maximum of three

or four teachers. In this way each teacher was expected to teach more than one subject.

Also a new curriculum was developed including subjects such as: Mozambican languages, English, Crafts, Music, Civic and Moral Education.

However, it is important to note that the cohort that was assessed by the SACMEQ III Project in 2007 was affected by only one part of the policy changes described above.

SACMEQ's Literacy and Numeracy Indicators

When the SACMEQ Consortium was launched in 1995, SACMEQ's Governing Board (the SACMEQ Assembly of Ministers) emphasized that the planning of improvements in the quality of education required better indicators of the "literacy" and "numeracy" skills that were being acquired by learners as they moved through the basic cycles of primary education. These indicators were considered important because they allowed senior decision-makers to assess the performance of school systems, and to provide information that could be used for strategies aimed at improving the quality of education.

The SACMEQ Ministers interpreted the concept of "literacy" as meaning reading comprehension skills that were transmitted through school language and reading instruction programmes. They interpreted "numeracy" as meaning the numerical and mathematical reasoning skills that formed the core of school mathematics programmes. The SACMEQ Ministers wanted their school systems to be judged by the extent to which learners acquired the knowledge and skills that they were expected to acquire – as specified in official school curricula, textbooks, and teachers' guides.

The SACMEQ Ministers decided that the design of tests for the assessment of pupil achievement in

reading and mathematics in the SACMEQ research programme should focus on:

- (a) **Grade 6** - because (i) they wanted to monitor the "output" of their primary education systems before large numbers of the learner cohort began to leave school, and (ii) they considered that assessments held at lower grade levels would result in distorted results due to the "turbulence" in learning environments that occurred in many schools during the changeover (at around Grades 3 to 4) from the delivery of instruction in local to the official or national languages; and
- (b) **The National Language of Instruction** - because they were concerned that the acquisition of reading and mathematics skills in the national language of instruction was necessary for a successful transition to secondary schooling.

The SACMEQ reading and mathematics tests were developed from a careful analysis of the official school curricula, school syllabi, and textbooks used in both Mozambique and other SACMEQ school systems. These tests made it possible to employ Modern Item Response Theory methods to undertake item analyses and test-scoring procedures. The test scores were transformed so that pupils from both the SACMEQ II and III Projects were placed on a single scale with the SACMEQ II scores anchored to a mean of 500 and a standard deviation of 100.

The SACMEQ reading and mathematics tests were scored in two different ways for different reporting purposes:

- (a) **Scaled Scores** – which were useful for reporting the average performance of learners at national and regional levels for both SACMEQ Projects. These scores were scaled so that meaningful comparisons could be made across countries for each project, and across projects for each country. The average scaled scores for Mozambique and its provinces have been reported in **Table 1** for the SACMEQ II Project (2000) and the SACMEQ III Project (2007).
- (b) **Competency (or Skill) Levels** – which were useful for presenting a descriptive account of (i) the skills that pupils had acquired at eight levels of competence measured by the scaled scores, and (ii) the skills that must be acquired for pupils to move from one level of competence to a higher level. The competency levels for reading and mathematics have been described in **Table 2(a)** and **Table 2(b)**, respectively. These tables show the percentages of Mozambique's pupils at each competency level for the SACMEQ II Project (2000) and the SACMEQ III Project (2007).

Results for Average Scaled Scores

The average reading and mathematics scores of Grade 6 pupils across the 11 provinces of Mozambique were derived from SACMEQ reading and mathematics tests that were administered in Mozambique to 3177 Grade 6 pupils from 176 schools for the SACMEQ II Project in 2000, and 3360 Grade 6 pupils in 183 schools for the SACMEQ III Project in 2007.

In order to examine **levels of achievement**, the average scores were colour-coded to show their levels relative to the SACMEQ II Project overall mean of 500. Green figures indicated ten points or more above the SACMEQ average, red figures indicated ten points or more below the SACMEQ average, and black figures indicated within ten points of the SACMEQ average.

In order to show **trends in achievement**, colour-coded arrowheads were used to show changes in average scores between 2000 and 2007. A green arrowhead denoted an increase of ten points or more, a red arrowhead denoted a decrease of ten points or more, and a grey arrowhead denoted change of less than 10 points above or below the SACMEQ mean of 500.

(a) Achievement Levels

It can be seen from **Table 1** that for Mozambique as a whole, the mean score for reading decreased by 41 points, from 517 points in 2000 to 476 points in 2007. For mathematics, there was a decrease of 46 points in the national mean score, that is, from 530 points in 2000 to 484 points in 2007.

From the green figures in **Table 1**, it can be seen that the pupils from the regions of Maputo Cidade and Maputo registered a level of achievement above the SACMEQ average in both reading and mathematics.

The red figures in **Table 1** indicated that in 2007 pupils from Niassa registered the lowest level of reading and mathematics achievement.

It is important to note that the variation in the level of pupil achievement among the provinces was considerable in both subjects.

(b) Achievement Trends

From the red arrowheads in **Table 1** it can be seen that between 2000 and 2007 there was a general deterioration in the average scores for both reading and mathematics.

Results for Competence Levels

Another way in which the SACMEQ results can be presented is by calculating the percentages of pupils who had reached each level of competence on a hierarchical scale of competence levels as explained below.

The reading and mathematics test items were first arranged in order of difficulty, and then examined item-by-item to describe the specific skills required in order to provide correct responses. Items were then placed in groups so 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.

This “skills audit” for the reading and mathematics tests resulted in the identification of eight hierarchical levels of competence for each test (Level 1 being the lowest, and Level 8 being the highest).

The results of the skills audit have been presented in **Tables 2(a), and 2(b)**. A description or summary name was linked with each of the levels – in order to summarize the competencies associated with each group of test items. The first three competence levels in reading and mathematics employed the same prefixes (Pre, Emergent, and Basic) in order to reflect the mechanical nature of the most elementary competencies. From the fourth level upwards, the prefixes of the summary names were different for reading and mathematics, and were designed to reflect deeper levels of understanding of subject specific competencies.

The eight competence levels provided a more concrete analysis of what pupils could actually do. They also suggested instructional strategies relevant to learners who were learning at each level of competence.

For reading, it can be seen that there were increases in the percentages of pupils who were performing at Levels 1 to 3, as indicated by the plus (+) symbols in front of the figures in the final column of **Table 2(a)**. This means that in 2007 there was an increase in the number of pupils performing at lower levels of reading competence. At the same time it can be seen that there was a decline in percentages of pupils who were performing at higher levels of competence (Levels 4, 5, 6 and 7), as indicated by the minus (-) symbol in front of the figures.

Overall it can be seen that pupils’ reading competence deteriorated between 2000 and to 2007 which implies

that fewer pupils could develop higher levels of competence such as inferential or analytical reading.

For mathematics, **Table 2(b)** showed that the percentage of pupils who were performing at the basic levels (Levels 1 and 2) increased. In contrast, the percentages of the pupils performing at higher levels of mathematics notably decreased. This means that in 2007 fewer pupils were capable of reaching skills related to beginning numeracy (Level 4) or competent numeracy (Level 5).

Summary of Results

The results discussed in this Policy Brief have shown that there was a decline in the performance of Grade 6 pupils in Mozambique in both reading and mathematics between 2000 and 2007 in most provinces. However, pupils from certain provinces were performing above the SACMEQ mean score of 500 in 2007.

The results showed that there were wide differences in pupils’ achievement across the 11 provinces of Mozambique in 2007.

The general decline in pupil achievement can probably be attributed to a combination of several factors related to the rapid expansion of the education system.

Research-Based Conclusions

The following conclusions have been based on the results discussed in this Policy Brief concerning: (a) achievement levels for Grade 6 pupils as measured by scaled test scores, and (b) achievement trends of Grade 6 pupils – as measured by their location in one of the 8 competency levels.

1. Levels of Achievement: In 2007 the average reading (476) and mathematics (484) performance of Grade 6 pupils in Mozambique was below the SACMEQ overall average (512 and 510 respectively for reading and mathematics).

Education authorities should consider conducting appropriate interventions to improve pupils’ performance in reading and mathematics. Efforts must be especially focused on the provinces showing the lowest levels of pupil achievement.

2. **Trends in Achievement: Between 2000 and 2007 all provinces experienced an important decline in pupil reading and mathematics performance. This implies that there was an overall deterioration in the academic performance of Grade 6 Pupils.**

A Concluding Comment

The task of improving the quality of education for a whole system of education must be seen as a long-term challenge. There are very few examples in the world where “quick fix” responses have resulted in system-wide positive improvements in the quality of education delivered across a nation.

The results presented in this paper suggest that programs introduced since 2004 have not yet produced the expected results of improving the quality of education in Mozambique.

The Ministry needs to develop a clear implementation strategy that takes into account both: (a) the facilitating and constraining factors within Mozambique’s context, and (b) the existing linkages between policy suggestions and other development implications within the education sector.

Authors

Flávio Magaia
(fmagaia@hotmail.com)

Trindade Nahara
(tnahara@yahoo.com)

Ana Passos
(anapassos49@hotmail.com)

A copy of this Policy Brief can be downloaded from the SACMEQ Website: www.sacmeq.or

SACMEQ wishes to acknowledge the financial assistance provided by the Ministry of Foreign Affairs of the Government of the Netherlands in support of SACMEQ’s research and training programmes.

Table 1: Levels and Trends in Pupil Achievement across Provinces in Mozambique

	Learner reading score			Learner mathematics score		
	2000	2007		2000	2007	
Cabo Delgado	460	448	▼	498	460	▼
Gaza	504	487	▼	526	504	▼
Inhambane	508	498	►	541	506	▼
Maputo Cidade	549	540	►	547	512	▼
Manica	512	466	▼	543	483	▼
Maputo	530	511	▼	535	509	▼
Nampula	534	461	▼	539	472	▼
Niassa	454	441	▼	488	445	▼
Sofala	513	454	▼	523	472	▼
Tete	488	427	▼	511	455	▼
Zambezia	514	470	▼	517	478	▼
MOZAMBIQUE	517	476	▼	530	484	▼
SACMEQ	500	512	▲	500.0	510	▲

Values in **Green** = 10 points or more above SACMEQ II mean of 500

Values in **Black** = less than 10 points above or below SACMEQ II mean of 500

Values in **Red** = 10 points or more below SACMEQ II mean of 500

Notes about trend:

▲ Increased by 10 points or more ► Minimal change (less than ±10) ▼ Decreased by 10 points or more

Table 2(a): Percentages of Learners Reaching Various Levels of Competence in Reading

Reading Skill Levels			2000	2007	Change
Level	Description	Skill/Competence	%	%	%
1	Pre-reading	Matches words and pictures involving concrete concepts and everyday objects.	2.3	6.7	+4.4
2	Emergent Reading	Matches words and pictures involving prepositions and abstract concepts.	3.9	14.8	+10.9
3	Basic Reading	Interprets meaning (by matching words and phrases, completing sentences).	11.2	22.0	+10.8
4	Reading for Meaning	Reads to link and interpret information located in various parts of the text.	28.8	25.0	-3.8
5	Interpretive Reading	Interprets information from various parts of the text in association with external information.	32.7	17.9	-14.8
6	Inferential Reading	Reads to combine information from various parts of the text so as to infer the writer's purpose.	16.1	10.7	-5.4
7	Analytical Reading	Locates information in longer texts (narrative, document or expository) in order to combine information from various parts of the text so as to infer the writer's personal beliefs (value systems, prejudices and biases).	5.0	2.7	-2.3
8	Critical Reading	Reads from various parts of the text so as to infer and evaluate what the writer has assumed about both the topic and the characteristics of the reader	0.1	0.3	+0.2

Table 2(b): Percentages of Learners Reaching Various Levels of Competence in Mathematics

Mathematics Skill Levels			2000	2007	Change
Level	Description	Skill/Competency	%	%	%
1	Pre-Numeracy	Applies single step addition and subtraction.	0.4	5.1	+4.7
2	Emergent Numeracy	Applies a two-step addition and subtraction involving carrying.	12.6	27.7	+15.1
3	Basic Numeracy	Translates verbal information into arithmetic operations.	41.7	41.1	-0.6
4	Beginning Numeracy	Translates verbal or graphic information into simple arithmetic problems.	32.1	20.9	-11.2
5	Competent Numeracy	Translates verbal, graphic, or tabular information into an arithmetic form in order to solve a given problem.	11.4	3.9	-7.5
6	Mathematically Skilled	Solves multiple-operation problems (using the correct order) involving fractions, ratios, and decimals.	1.7	0.8	-0.9
7	Concrete Problem Solving	Extracts and converts information from tables, charts and other symbolic presentations in order to identify, and then solve multi-step problems	0.1	0.3	+0.2
8	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 a problem.	0.0	0.0	--