Policy Brief

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Southern and Eastern Africa Consortium for Monitoring Educational Quality

Trends in Achievement Levels of Grade 6 Pupils in Swaziland

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Introduction

This Policy Brief provides information about levels and trends in the reading and mathematics achievement of Grade 6 pupils in Swaziland 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).

One of the key issues in Swaziland has been the provision of education of good quality to all citizens. The SACMEQ research has facilitated the monitoring of quality standards at the national level. The results of the SACMEQ research undertaken in 2000 and 2007 provided valuable information about monitoring trends (improvements or challenges) that might suggest implications for future policy making. This is very important because through the SACMEQ studies it has been possible to identify issues that require further improvement in order to ensure the delivery of education of good quality throughout the four regions of the country.

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 pupils 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 pupils 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 pupil 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 Swaziland 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 Grade 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 pupils at national and regional levels for both SACMEQ II and III 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 Swaziland and its regions 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 Swaziland'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 4 regions of Swaziland were derived from SACMEQ reading and mathematics tests that were administered in Swaziland to 3 322 Grade 6 pupils from 170 schools for the SACMEQ II Project in 2000, and 4 030 Grade 6 pupils in 172 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 Swaziland as a whole, the mean score for reading increased by 19 points, from 530 points in 2000 to 549 points in 2007. For mathematics, there was a more important improvement of 34 points in the national mean score, that is, from 517 points in 2000 to 541 points in 2007.

From the green figures in **Table 1**, it can be observed that pupil reading scores in Manzini and Shiselweni increased by 31 and 24 points respectively between 2000 and 2007. However, the changes registered in Hhohho and Lubombo were minimal.

For mathematics it can be seen that three regions registered substantial improvement in pupils' scores between 2000 and 2007. For example, Manzini and Shiselweni showed an increase of 35 and 34 points respectively while Lubombo showed an increase of 19 points. However, the only region that registered a minimal change was Hhohho.

(b) Achievement Trends

From the green arrowheads in **Table 1**, it can be observed that at a national level the performance of Grade 6 pupils improved in both reading and mathematics.

However, at the region level the pupils' reading scores in Lubombo registered a minimal change whereas in Hhohho negligible changes were registered in both pupils' reading and mathematics scores.

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 pupils who were learning at each level of competence.

From Table 2a. it is possible to observe that the highest percentages of pupils' reading skills were concentrated at level 4 (20.7 %), level 5 (34.5 %) and level 6 (34.5). This means that the majority of the pupils in Swaziland reached competences associated with reading for meaning, interpretative or inferential reading.

Between 2000 and 2007 noticeable decreases were registered in the percentages of pupils who were performing at level 3 (basic reading) and level 4 (reading for meaning) as indicated by the minus (-) symbols in front of the figures in the final column of **Table 2(a)**. However, there was an increase (indicated by a plus (+) symbol) in the percentages of pupils who performed at Levels 5, 6 and 7. This suggested that in 2007 pupils' achievement levels improved to the extent that more pupils were able to interpret, infer and analyse texts.

For mathematics, in **Table 2(b)** it can be seen that nearly 72 percent of the Grade 6 pupils were performing at either Level 3 (basic numeracy) or Level 4 (beginning numeracy). It is also important to note that in 2007 the percentage of pupils who were performing at Levels 4 (beginning numeracy) increased by 15.2. Similarly, the percentages of pupils performing at Level 5 (Competent numeracy) and Level 6 (Mathematically skilled) increased by 4.3 percent and 3 percent respectively. Therefore, the results presented in these tables suggest that the performance of Grade 6 pupils has evolved from the basic numeracy level reaching more advanced levels such as the beginning and competent numeracy levels.

Summary of Results

The results discussed in this Policy Brief have shown that overall there was an improvement in pupils' performance between 2000 and 2007. In other words, Grade 6 pupils in Swaziland have acquired higher levels of competence in both reading and mathematics.

However, at the region level negligible changes were observed in Hhohho and Lubombo. The causes of the lower results observed in these regions might be attributed to different factors such as poor reading resources, lack of school facilities or lack of adequate teacher training.

However, it is important to note that the general improvement in pupil achievement levels in Swaziland between 2000 and 2007 can probably be attributed to a combination of several factors which include the introduction of: a) free textbooks and teachers' guides for all primary grades, b) extra reading materials through the "class library boxes" initiative introduced in 2005 and c) the recruitment of teachers holding university degrees in humanities.

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.

Levels of Achievement: In 2007 the average reading performance of Grade 6 pupils in Swaziland was 549 points which was above the SACMEQ mean of 500. However, Hhohho performed below the country average.

Education authorities need to take action together with schools at the regional education office in Hhohho in order to support the academic improvement of Grade 6 pupils in this region.

1. **Trends in Achievement: Between 2000 and 2007 two regions in Swaziland experienced an improvement whereas two regions experienced**

some stagnation in the average reading performance of Grade 6 pupils.

Education authorities should disseminate this information and the national English (reading) panel should investigate the reasons why Grade 6 pupils' achieve lower reading levels in the Hhohho and Lubombo regions.

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.

There is a need to investigate the causes that might prevent Grade 6 pupils from reaching more advanced levels of reading and mathematics competence in certain regions. It has been suggested that the contents taught at school did not encourage pupils to develop the more advanced mathematics skills such as concrete and abstract problem solving (Levels 7 and 8).

For this reason, it is important to revise the school curricula and ensure an effective teaching training so that teachers can better support their pupils and help them achieve higher levels of both reading and mathematics competence.

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

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Table 1: Levels and Trends in Pupil Achievement across Regions in Swaziland

	Pupil reading score			Pupil mathematics score		
	2000	2007		2000	2007	
Hhohho	541	547	▶	527	537	▶
Lubombo	534	552	▶	524	543	▲
Manzini	525	556	▲	509	544	▲
Shiselweni	517	541	▲	505	539	▲
SWAZILAND	530	549	▲	517	541	▲
SACMEQ	**500**	512	▲	**500**	**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 Pupils 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.	0.3	0.2	**-0.1**
2	Emergent Reading	Matches words and pictures involving prepositions and abstract concepts.	1.7	1.2	**+0.5**
3	Basic Reading	Interprets meaning (by matching words and phrases, completing sentences).	10.9	5.6	**-5.3**
4	Reading for Meaning	Reads to link and interpret information located in various parts of the text.	31.7	20.7	**-11.0**
5	Interpretive Reading	Interprets information from various parts of the text in association with external information.	31.4	34.5	**+3.1**
6	Inferential Reading	Reads to combine information from various parts of the text so as to infer the writer's purpose.	15.3	25.7	**+10.4**
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).	6.9	10.1	**+3.2**
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	1.8	1.8	**=**

Table 2(b): Percentages of Pupils 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.	0.8	0.2	**-0.6**
2	Emergent Numeracy	Applies a two-step addition and subtraction involving carrying.	21.3	8.4	**-12.9**
3	Basic Numeracy	Translates verbal information into arithmetic operations.	44.3	35.7	**-8.6**
4	Beginning Numeracy	Translates verbal or graphic information into simple arithmetic problems.	21.8	37.0	**+15.2**
5	Competent Numeracy	Translates verbal, graphic, or tabular information into an arithmetic form in order to solve a given problem.	8.6	12.9	**+4.3**
6	Mathematically Skilled	Solves multiple-operation problems (using the correct order) involving fractions, ratios, and decimals.	2.4	5.4	**+3.0**
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	0.7	0.3	**+0.4**
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.	0.2	0.0	**=**