

Policy Brief

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Southern and Eastern Africa Consortium
for Monitoring Educational Quality

Trends in Achievement Levels of Grade 6 Learners in Seychelles

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Introduction

This policy brief provides information about levels and trends in the reading and mathematics achievements of Seychellois Grade 6 pupils. The results are drawn from two large-scale, cross-national research studies of the quality of education conducted by the fifteen school systems involved in the Southern and Eastern Africa Consortium for Monitoring Educational Quality (SACMEQ).

The publication of the results of SACMEQ II for Seychelles in 2005 generated high level discussions amongst planners and practitioners at the Ministry of Education. Some of the major policy concerns then were related to the practice of streaming in primary schools, the status of mathematics education, literacy and numeracy in the early years and the development of a policy framework on assessment (Leste et al, 2005).

In the first instance, concern was raised about the wide differences in the performance of pupils within schools, which led to the implementation of a policy of de-streaming across all primary schools. The impact of this policy on pupil' performance is however yet to be felt. There is reason to believe that there is still substantial resistance from parents on the practice of de-streaming as well as from some members within the teaching community.

Secondly, the SACMEQ II report showed that despite the fact that Seychelles performed well, by SACMEQ standards, in both reading and mathematics, there was a "disproportionately large percentage of pupils" performing at the lower three levels in mathematics and around 10 percent of Primary 6 pupils remaining illiterate (Leste, 2009). This prompted the Ministry of Education to set up a Mathematics Working Group (MWG) which was mandated with the task of designing and implementing an intervention programme called "Improving Pupils' Achievements in Mathematics" or IPAM. From the outset, the Group set itself the target of 50 percent of pupils to be at least at

Level 5 in numeracy by the time they completed primary education. Results from a longitudinal study showed the figure was seven percent short of this target by the time the research cohort exited Primary Six in 2009 (Benstrong, 2010).

The intervention of the Working Group also had a significant impact on the quality of instruction in the classroom. It led, for instance, to the creation of the post of subject coordinators as part of the strengthening of curriculum leadership and also to the implementation of the Mathematics Lesson Structure (MLS) as a more effective means of lesson planning by better sequencing of activities (MWG, 2006).

Finally, an important development that transpired for the intervention by the Mathematics Working Group was the publication of a draft assessment framework for mathematics. The competency levels derived from the SACMEQ II Project were further expanded to take into account the primary mathematics curriculum and good practices from elsewhere, such as the seminal work of National Council of Teachers of Mathematics (NCTM, 2000) in the United States of America.

For the first time in the Seychelles, teachers were planning lessons and conducting assessments against indicators derived from the framework.

Despite these interventions and several other school-based action research initiatives in reading and mathematics, the results produced in this Policy Brief suggest that the desired impacts are yet to be felt in the achievements of Primary 6 pupils.

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 Seychelles 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 Seychelles 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 learners had acquired at eight levels of competence measured by the scaled scores, and (ii) the skills that must be acquired for learners 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 Seychelles’ 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 six regions of Seychelles were derived from SACMEQ reading and mathematics tests that were administered in Seychelles to 1485 Grade 6 pupils from 24 schools for the SACMEQ II Project in 2000, and 1480 Grade 6 pupils in 24 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 Seychelles as a whole, there was a minimal decrease of 7 points in the mean score for reading, from 582 points in 2000 to 575 points in 2007. For mathematics, a negligible decrease of four points could be observed in the national mean score, that is, from 554 points in 2000 to 550 points in 2007.

From the green figures in **Table 1**, it can be seen that all six regions in Seychelles showed very high levels of reading achievement for both 2000 and 2007 as the mean scores were above the SACMEQ average. The same can be said for mathematics.

(b) Achievement Trends

From the red arrowheads in **Table 1**, it can be seen that in two of the six regions, namely, Central and Western, performance on the Reading test decreased by 16 points and 35 points respectively. On the other hand, the Northern region managed to improve performance in Reading by almost 18 points.

In Mathematics, the changes in the performance for most regions were minimal. The Northern region managed to improve performance by 20 points but for the Western region however, pupil performance declined by 11 points.

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 decreases in the percentages of pupils who were performing at Levels 4 and 5 and to a lesser extent at Level 8, as indicated by the (-) symbols in front of the figures in the final column of **Table 2(a)**.

This meant that the percentages of pupils who were performing at higher levels of reading competence decreased only marginally at the level of Critical Reading (Level 8). Also it is worth mentioning that there was an increase of three percent at the level Inferential Reading (Level 6), indicated by the plus (+) symbol. This means that there was an increase in the number of pupils operating at a higher level of reading competence which was a positive sign. However, it is also important to note that about 43 percent of Primary 6 pupils in the Seychelles were still performing at “Basic Reading” levels of competence.

For mathematics, **Table 2(b)** showed that the percentage of pupils who were performing at Level 4 increased by 6 percent, and the percentage of pupils performing at Level 1, 3 and 7 decreased by 1, 4 and 3 percent respectively. The decrease in the percentage of pupils at the two lowest levels is altogether a welcoming sign, as it was the intention of the mathematics improvement programme to reduce the number of pupils performing at these lower levels so that more pupils would perform at higher levels of mathematics competence.

Nevertheless, compared to 2000, the percentage of pupils reaching the “Advanced mathematic skills” level declined by three percent. At the same time, 70 percent of pupils were still performing at the lower levels. This remained as a major concern.

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 Seychelles in both reading and mathematics between 2000 and 2007 in most regions.

In addition, the results showed that in both 2000 and 2007 there were very wide differences in pupil achievement across the six regions of Seychelles. For example, there was a decrease for the reading and mathematics score for the Western and Central regions while there was an increase in both scores for the Northern region.

The general decline in pupil achievement levels in Seychelles between 2000 and 2007 can probably be attributed to a combination of several factors. For example, between SACMEQ II and III, Seychelles underwent a period of very difficult economic adjustments. It was a period of great anxiety, as major re-structuring of the public sector meant that as much as 20 percent of the workers in that sector alone were made redundant.

However, it was very surprising to find out that there was a decrease in pupil reading and mathematics performance. These unexpected results emerged at a time when many improvement initiatives were implemented for both subjects at both national and school based levels through action research projects.

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/std 6 pupils/learners – as measured by their location in one of the 8 competency levels.

- 1. Levels of Achievement: In 2007 the average reading performance of Grade 6 pupils in Seychelles was 575 and this was above the SACMEQ average of 512. In mathematics, the average performance of Grade 6 pupils was 551 compared to a SACMEQ average of 510.**

Education authorities should discuss the implications of these findings with the Curriculum, Assessment and Teacher Support section, Schools Division, the Inspection Section, and the School of Education of the University of Seychelles in order to implement strategies capable of improving the quality of instruction and learning in Seychelles' primary schools.

- 2. Trends in Achievement: Between 2000 and 2007 the Central and Western regions experienced a decline in the average reading score. Similarly, the Western region experienced a decline in the mathematics performance of Grade 6 pupils. Only the Northern region experienced an improvement in both the reading and mathematics performance.**

The Ministry of Education should urgently work with curriculum leaders of the Western region in particular, through the Schools' Division, in order to produce intervention, monitoring, and teacher support plans in order to reverse the trend in performance.

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 government of Seychelles has become increasingly concerned about educational outcomes and the impacts that these have on economic development, responsible citizenry, and the wholesome development of individuals. These issues have formed the basis for the new generation of education reforms.

It is important to note that various interventions such as the IPAM project and other schools based action research initiatives were put into practice with the objective of improving the teaching and learning processes of both reading and mathematics. However, the findings presented in this Policy Brief suggest that between 2000 and 2007 the Seychelles education system did not produced the expected results in reading and mathematics.

At the same time, it is worth noting that pupils' performance in Seychelles was above the SACMEQ average in both reading and mathematics. However, the fact that there was no discernable change in the positive direction remains a source of concern. The Department of Education should renew its efforts in improving teaching practices, monitoring and the quality of support provided at the classroom level.

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

References

Benstrong, E. (2008) *Primary Mathematics Assessment Framework*. Ministry of Education. Seychelles.

Benstrong, E. (2010) *Mathematics Report For Primary Six Examination for 2009*. Ministry of Education, Seychelles.

Leste, A., Valentin, J. & Hoareau, F.(2005) *The SACMEQ II Project in Seychelles. A Study of the Condition of Schooling and the Quality of Education*. Harare. SACMEQ. www.sacmeq.org

Leste, A. (2009) *The SACMEQ Project – Progress Report*. Ministry of Education. Seychelles.

Mathematics Working Group (2006) *Our Course*. Ministry of Education and Youth. Seychelles.

National Council of Teachers of Mathematics. (2000). *Principles and Standards for School Mathematics*. Available at <http://standards.nctm.org/>

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Table 1: Levels and Trends in Pupil Achievement Across Regions in Seychelles

	Learner reading score			Learner mathematics score		
	2000	2007		2000	2007	
Central	597	581	▼	567	557	▶
Eastern	560	575	▶	552	548	▶
Island	577	565	▶	552	544	▶
Northern	567	585	▲	535	554	▲
Southern	585	585	▶	554	551	▶
Western	585	550	▼	550	539	▼
SEYCHELLES	582	575	▶	554	550	▶
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 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.	3	4	+1
2	Emergent Reading	Matches words and pictures involving prepositions and abstract concepts.	7	7	0
3	Basic Reading	Interprets meaning (by matching words and phrases, completing sentences).	9	10	+1
4	Reading for Meaning	Reads to link and interpret information located in various parts of the text.	13	10	-3
5	Interpretive Reading	Interprets information from various parts of the text in association with external information.	15	12	-3
6	Inferential Reading	Reads to combine information from various parts of the text so as to infer the writer's purpose.	15	18	+3
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).	22	22	0
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	17	16	-1

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.	3	2	-1
2	Emergent Numeracy	Applies a two-step addition and subtraction involving carrying.	20	16	-4
3	Basic Numeracy	Translates verbal information into arithmetic operations.	24	24	0
4	Beginning Numeracy	Translates verbal or graphic information into simple arithmetic problems.	20	26	+6
5	Competent Numeracy	Translates verbal, graphic, or tabular information into an arithmetic form in order to solve a given problem.	14	14	0
6	Mathematically Skilled	Solves multiple-operation problems (using the correct order) involving fractions, ratios, and decimals.	13	13	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	5	2	-3
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.	1	1	0