



Southern and Eastern Africa Consortium
for Monitoring Educational Quality

Trends in Achievement Levels of Standard 6 Pupils in Kenya

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Introduction

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

Although Kenya had participated in the first, SACMEQ I Project (1995-1998) and the second SACMEQ II Project (2000-2004) it was only after 2005 that monitoring and evaluation of educational quality became part of the core policy for the management of education in Kenya.

The government of Kenya responded to international commitments to Education for All (EFA) goals, by launching the policy of Free Primary Education (FPE) in 2003. This was followed by the drafting of the Sessional Paper No. 1 (Republic of Kenya, 2005a) which became the basis for the development of the Kenya Education Sector Support Programme (KESSP). This programme addressed quality issues linked to the provision of free basic education at the national level. Through KESSP, the Ministry of Education established the National Assessment System for Monitoring Learner Achievement (NASMLA) which provided the framework for the conduct of national assessment in Kenya (Kimani, 2007).

It is under this policy context that the third phase of the SACMEQ study was conducted. It was anticipated that the SACMEQ III Project (2007-2011) would provide the initial comprehensive review of the quality of basic education in Kenya under the FPE policy.

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) **Standard 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 Standard levels would result in distorted results due to the "turbulence" in learning environments that occurred in many schools during the changeover (at around Standards 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 Kenya 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 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 Kenya 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 Kenya’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 Standard 6 pupils across the 8 provinces of Kenya were derived from SACMEQ reading and mathematics tests that were administered in Kenya to 3,299 Standard 6 pupils from 185 schools for the SACMEQ II Project in 2000, and 4,436 Standard 6 pupils in 193 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 Kenya as a whole, there was a minimal decrease of 3 points in the mean score for reading, from 546 points in 2000 to 543 points in 2007. For mathematics, there was a decrease of 6 points in the national mean score, that is, from 563 points in 2000 to 557 points in 2007. These decreases are negligible because they are less than 10 points.

From the green figures in **Table 1**, it can be seen that nearly all the provinces registered mean scores that were substantially higher than the SACMEQ II mean of 500 points for both reading and mathematics, for both 2000 and 2007. However, the Eastern and Western provinces registered some decline in the pupils’ reading performance between 2000 and 2007.

For mathematics, nearly all the provinces registered achievement levels that were above the SACMEQ mean score for both 2000 and 2007 except for Eastern and Western provinces which registered declines of 12 and 23 points respectively. However it should be noted that the overall national mean scores for reading and mathematics in Kenya as a whole were above the SACMEQ mean in 2000 and 2007.

(b) **Achievement Trends**

From the green arrowheads in **Table 1**, it can be seen that pupils in North Eastern province registered improvement in both reading and mathematics. This may be attributed to the success of certain interventions such as the development of a targeted policy (Republic of Kenya, 2010) and the implementation of externally funded programmes such as “Education for Marginalized Children in Kenya” (Aga Khan, 2010). Pupils’ performance in Western and Eastern provinces declined in both reading and mathematics. Other studies have attributed the declining performances in these provinces to the high prevalence of pupil absenteeism and high repetition rates occasioned by a combination of poverty, child labour and parental indifference (Wasanga, Ogle & Wambua, 2010). In three regions (Coast, Nairobi, and Rift Valley) the performance of standard 6 pupils registered minimal changes 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 pupils who were learning at each level of competence.

For reading, it can be seen that there were slight increases in the percentages of pupils performing at the rudimentary levels 1 and 2, as indicated by plus (+) symbols in front of figures in the final column of Table 2(a). There was a slight decrease in the percentage of pupils reaching level 5, and a slight increase in the percentage of pupils reaching level 8. Although these changes were negligible, the slight increase observed in the percentages of pupils performing at level 8 (Critical reading) is a good sign because advanced reading skills are related to pupil’s success in further education and future employment (Bradley, Paul & Seeman, 2004). This implies that teaching and learning activities should be more focused on progressing the majority of

the pupils from the lower levels to higher levels of reading comprehension.

For mathematics, **Table 2(b)** showed that there was an increase in percentage of pupils (6.4%) reaching level 4 (ability to translate verbal or graphic information into simple arithmetic problems). This is good because this level represents the thresh-hold for progressing pupils to higher levels of competence. Generally, it can be seen that the percentages of Standard 6 pupils reaching the various levels of competence in 2000 and 2007 was more or less the same because the differences were negligible. The efforts of the Ministry of Education should be aimed at supporting pupils’ learning so that more pupils will be able to make progress and acquire the more advanced levels of mathematics competence.

Summary of Results

The results discussed in this Policy brief have shown that Kenyan Standard 6 pupils scored above the SACMEQ mean in both reading and mathematics. However, the slight decline in the mean scores for both reading and mathematics between 2000-2007 suggests that there has been some kind of stagnation. In other words, at the national level it can be seen that Standard 6 pupils did not improve their levels of achievement. At the province level the results showed that there were wide differences in pupil achievement across provinces. For example, there was an improvement in the performance of pupils in the North Eastern province. In contrast, the performance of pupils in the Western and Eastern provinces declined for both reading and mathematics. In other places such as Nairobi Standard 6 pupils registered high mean scores in reading and mathematics. However, no improvement was registered between 2000 and 2007.

The general stagnation in pupil achievement levels in Kenya between 2000 and 2007 can probably be attributed to a combination of several factors. The introduction of the FPE policy in the year 2003 led to an increase in school population and strained human and physical resources (UNESCO, 2005). For example, shortages in teachers and facilities in most rural public schools that enrolled the majority of pupils from poor households may have contributed to the noticed decline in pupil achievement levels. It is expected that the various interventions that the Ministry of Education has put in place to deal with these challenges (MoE, 2010) will bear fruit in future.

Research-Based Conclusions

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

1. Levels of Achievement: In 2007 the average reading performance of Standard 6 pupils in Kenya (543) was above the SACMEQ II mean score of 500. However, no improvement was registered between 2000 and 2007.

In 2007 the average mathematics achievement for Standard 6 pupils in Kenya was 557, which was above the SACMEQ mean. However, the overall mathematics mean score for Kenya registered in 2007 showed a slight decline.

Education authorities should strengthen measures to effectively monitor the implementation of the policy of “Free Primary Education” (FPE) in order to take corrective interventions that improve the quality of primary education.

In addition, mathematics teachers should be encouraged to emphasize problem solving in their mathematics lessons in order to encourage pupils to develop advanced skills in this subject.

2. Trends in Achievement: Between 2000 and 2007 only three provinces in Kenya experienced an improvement in the average reading performances of Standard 6 pupils. For mathematics only one region registered substantial improvement in achievement while 5 provinces registered minimal change.

The Ministry of Education should investigate the underlying reasons for (a) the slight increases in pupils’ achievement in provinces, (b) the deterioration in pupils’ performance in other provinces, and (c) the overall stagnation in pupils’ achievement at the national level.

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 introduction of new policies such as the Free Primary Education should be accompanied with the provision of adequate human and material resources to ensure effective teaching and learning.

Structural changes in the education systems should be based on evidence that takes into account the local context of each province in Kenya.

The Ministry of Education and other stakeholders have in the last five years heavily invested in improving the quality of basic education through the FPE policy. These efforts have included: (a) development of infrastructure, (b) reinforcement of in-service teacher training, (d) implementation of mechanisms for school assessment and advisory visits, (e) recruitment of more teachers to alleviate shortages, and (f) expansion in the supply of learning materials. These positive interventions will take time to produce the desired results. However, the Standard 6 pupils’ achievement levels presented in this policy brief indicate that a lot of work still needs to be done.

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

	Pupil reading score			Pupil mathematics score		
	2000	2007		2000	2007	
Central	557	574	▲	579	574	▶
Coast	558	554	▶	568	570	▶
Eastern	568	551	▼	581	569	▼
Nairobi	625	622	▶	605	610	▶
North Eastern	527	560	▲	549	600	▲
Nyanza	534	545	▲	555	555	▶
Rift Valley	531	527	▶	551	549	▶
Western	527	497	▼	539	516	▼
KENYA	546	543	▶	563	557	▶
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.	1.0	2.3	+1.3
2	Emergent Reading	Matches words and pictures involving prepositions and abstract concepts.	4.6	5.7	+1.1
3	Basic Reading	Interprets meaning (by matching words and phrases, completing sentences).	10.8	11.8	-1
4	Reading for Meaning	Reads to link and interpret information located in various parts of the text.	20.4	19.6	-0.8
5	Interpretive Reading	Interprets information from various parts of the text in association with external information.	25.3	21.8	-3.5
6	Inferential Reading	Reads to combine information from various parts of the text so as to infer the writer's purpose.	19.2	18.7	-0.5
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).	13.6	13.7	+0.1
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	5.1	6.4	+1.3

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.	0.6	0.6	0
2	Emergent Numeracy	Applies a two-step addition and subtraction involving carrying.	10.1	10.6	+0.5
3	Basic Numeracy	Translates verbal information into arithmetic operations.	30.7	27.1	-3.6
4	Beginning Numeracy	Translates verbal or graphic information into simple arithmetic problems.	25.7	32.1	+6.4
5	Competent Numeracy	Translates verbal, graphic, or tabular information into an arithmetic form in order to solve a given problem.	17.9	15.5	-2.4
6	Mathematically Skilled	Solves multiple-operation problems (using the correct order) involving fractions, ratios, and decimals.	10.4	10.1	-0.3
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	3.3	2.5	-0.8
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.	1.3	1.4	+0.1