



# Proposing Benchmarks for Early Grade Reading and Mathematics in Ghana

## BACKGROUND

During 2013 the Ghana Education Service, with support from USAID and technical assistance by RTI International conducted a national study on the Early Grade Reading and Early Grade Mathematics learning outcomes among Primary Class 2 (P2) pupils. The purpose of this study was to provide data that can be translated into an evidence base to inform policy decisions and interventions. The baseline assessment provided rich performance and contextual data that can be used for guiding reforms or interventions to improve the attainment of foundations skills in literacy and numeracy in Ghana's primary schools and colleges of education.

The Early Grade Reading Assessment (EGRA) showed that by the end of P2, the majority of public school pupils could not yet read with comprehension—neither in a Ghanaian language nor in English. In every language, at least half, and often more, of the pupils assessed could not read a single word correctly. Some pupils had the ability to recognise a few words, but most of these pupils could not yet understand what they read. Of the pupils assessed in each language, in general only the top 2% or fewer were able to read with fluency and comprehension.<sup>1</sup>

Findings from the Early Grade Mathematics Assessment (EGMA) showed that by the end of P2, pupils were doing reasonably well on the most procedural items such as number identification, addition level 1 and subtraction level 1, with pupils scoring on average nearly 50% or better on these subtasks. When it came to the more conceptual items, there was a sharp drop-off in performance. For example, nearly 70% of the pupils were unable to answer a single subtraction level 2 item

correctly—the easiest of these being:  $19 - 6 = \square$ . This stark difference in performance between the procedural and conceptual subtasks suggests a lot about how children in Ghana are likely to experience school mathematics. That is, it is likely that they experience mathematics as a subject in which they have to know the answer rather than having a strategy for developing it: mathematics as the memorisation of facts, rules and procedures.

Primary Class 2 pupils are not, on average, attaining a level of reading skills adequate to ensure full comprehension of what they read. This begs the question, “What is an acceptable level of reading achievement for Ghanaian pupils in the early grades of primary school?” Similarly, “What is an acceptable level of mathematics achievement for Ghanaian pupils in the early grades of primary school?”

With additional assistance from USAID two workshops to address these questions were held, the first on the 13<sup>th</sup> of February 2014 for reading and the second on the 5<sup>th</sup> of May for mathematics.

Only a handful of developing countries have taken on the challenge of setting benchmarks for reading skills in the early grades. Mexico did so several years ago. More recently Kenya, Egypt, Liberia and Tanzania have defined benchmarks, with Kenya officially adopting a standard for oral reading fluency in both English and Kiswahili, and Tanzania benchmarks for reading and mathematics.

The results of the 2013 national study on early grade reading and early grade mathematics provided the evidence base for developing benchmarks for reading and mathematics that are appropriate for the current Ghanaian context.

<sup>1</sup> ‘...able to read with fluency and comprehension’ was defined as being able to correctly answer at least 4 (80%), or all 5 (100%) of the reading comprehension questions.

## THE BENCHMARK SETTING WORKSHOP

The two day-long workshops on the 13<sup>th</sup> of February and the 5<sup>th</sup> of May brought together education officials from the Ministry of Education (MOE) and the Ghana Education Service (GES), donor agency representatives, and language and mathematics experts to begin a process of defining benchmarks for specific skill areas of early grade reading and mathematics. The objectives of the workshop were to:

- Share the most recent assessment results from the national study on early grade reading and mathematics learning outcomes which involved administering the EGRA and EGMA to a representative sample of P2 pupils in Ghana. These tests were administered in both the local language of instruction and English.
- Orient and engage a cross section of Ghanaian stakeholders in a participatory process of setting reading and mathematics benchmarks for P2.

Following the presentation of study findings, participants were engaged in a discussion of benchmarks – what they are and how to set them by combining empirical data from Ghana, working knowledge of Ghana’s education sector, and common sense.

The objective of the benchmarking process was to determine:

- The benchmark value for the indicator for each identified subtask in reading and mathematics,
- The percentage of pupils that would be meeting that benchmark in five years, and
- The percentage of pupils who would be scoring zero on that indicator in five years.

Small working groups took on the challenge of analyzing the available information, discussing and debating what seemed possible, and then defining an initial set of benchmarks for P2.

The suggestions from the groups were recorded and areas of convergence and divergence in recommended benchmarks were identified and discussed so as to generate further convergence.

## THE READING SUBTASKS

The workshop helped define benchmarks for four reading subtasks evaluated using the EGRA. The four subtasks include:

- **Letter sound naming.** This subtask evaluates a pupil’s ability to read the sounds of letters given in the local language of instruction and in English. This subtask is timed and thus gives the number of letter sounds produced correctly per minute (clspm).
- **Non-word fluency.** This subtask evaluates a pupil’s ability to decode unfamiliar words. The subtask is timed, so the resulting measure is the number of non-words decoded correctly per minute (cnonwpm).
- **Oral reading fluency.** This subtask evaluates how well a child reads aloud a short passage of connected text. It is also timed, and therefore produces a measure that is the number of words of text read correctly per minute (cwpm).
- **Reading comprehension.** In this subtask pupils are asked questions relating to the text which they read aloud for the oral reading fluency portion of the assessment. The resulting measure is percentage of correct responses (comp).

## THE MATHEMATICS SUBTASKS

The workshop helped define benchmarks for three mathematics subtasks evaluated using the EGMA. The three subtasks include:

- **Addition and Subtraction Level 2.** This subtask evaluates a pupil’s ability to apply their “basic addition and subtraction facts” assessed in the Level 1 subtask to more conceptually demanding 2-digit addition and subtraction problems. The resulting measure is percentage of correct responses (add\_sub\_L2).
- **Missing number (pattern completion).** This evaluates a pupil’s ability to discern and complete number patterns by determining the missing number in a pattern of four numbers, one of which is missing. Patterns involve counting forward and backward by ones, fives,

tens, and twos. The resulting measure is percentage of correct responses (miss\_num).

- **Problem solving.** This subtask evaluates the pupil's ability to interpret a situation (presented orally to the pupil), make a plan and solve the mathematical problem. The pupils solve the word problems using any strategy that they want, including the use of paper and pencil and/or counters supplied by the assessor.

## THE BENCHMARK SETTING PROCESS

Data that expressed the relationship between the respective reading and mathematics subtasks were provided. For example, a scatter plot of oral reading fluency and comprehension showed that pupils who demonstrated comprehension at 80% or better were for the most part reading with oral fluency of between 45 and 65 words per minute. Similar data were used to demonstrate the relationship between pupils' decoding abilities (as measured by non-word reading) and their levels of oral reading fluency. In the case of mathematics, participants had to rely on their expectations of pupils' performance on the subtasks in relation to the expectations of the curriculum to set benchmarks.

**Table 1** summarizes the results of the group work defining benchmarks for all the four reading and three mathematics subtasks for P2.

## INSTITUTIONALISING THE BENCHMARKS

On the 6<sup>th</sup> of May 2014, the results of the benchmarking workshops were presented to high level education officials at the GES Director General's conference room. In attendance were officials from the GES and the MOE, the Dean of the Faculty of Education at the University of Cape Coast, the Director of the National Institute of Education, and USAID representatives.

The proposed benchmarks for the various subtasks were accepted at the meeting. The five year targets with respect to the number of pupils achieving the benchmarks and the number of pupils scoring zero on the subtasks were also adopted.

The discussion of benchmarks and targets was followed by a lively discussion about what initiatives were needed to advance improved early grade learning outcomes in Ghana. Among other things, parental involvement and re-instating the secondary school requirement for Ghanaian language were featured in the discussion.

**Table 1a: National Benchmarks and Targets for Reading in Ghana**

		Ghanaian language				English			
		clspm	cnonwpm	cwpm	comp	clspm	cnonwpm	cwpm	comp
<b>2013 study data</b>	Mean (average)	10	2.7	3.7	3.2%	9.6	3	9.2	4.2%
	% zero scores	44.6%	82.0%	78.1%	91.8%	54.5%	78.5%	50.4%	90.2%
<b>Benchmarks</b>	Proposed benchmark	<b>40</b>	<b>25</b>	<b>40</b>	<b>80%</b>	<b>35</b>	<b>20</b>	<b>45</b>	<b>80%</b>
<b>Percentage P2 pupils achieving benchmark</b>	2013 study	7%	3.7%	2.5%	0.9%	8%	6%	7%	1.5%
	Proposed 5 year target	35%	19%	13%	5%	40%	30%	35%	8%
<b>Percentage of zero scores</b>	2013 study	44.6%	82.0%	78.1%	91.8%	54.5%	78.5%	50.4%	90.2%
	Proposed 5 year target	22%	41%	39%	46%	27%	39%	25%	45%

**Table 1b: National Benchmarks and Targets for Mathematics in Ghana**

		add_sub_L2	miss_num	Problem solving
<b>2013 study data</b>	Mean (average)	16.6%	26.2%	40%
	% zero scores	46%	7.60%	9%
<b>Benchmarks</b>	<b>Proposed benchmark</b>	<b>80%</b>	<b>70%</b>	<b>80%</b>
<b>Percentage P2 pupils achieving benchmark</b>	2013 study	3.1%	3.3%	11%
	Proposed 5 year target	16%	16%	55%
<b>Percentage of zero scores</b>	2013 study	46%	7.6%	9%
	Proposed 5 year target	23%	4%	4%