



Ghana 2013
Early Grade Reading Assessment
and
Early Grade Mathematics Assessment
Report of Findings



May 2014 (Final Version)

Ministry of Education
Ghana Education Service
National Education Assessment Unit

Ghana 2013

Early Grade Reading Assessment

and

Early Grade Mathematics Assessment

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Abbreviations

ASU	Assessment Services Unit (renamed in Sept. 2013; see NEAU)
clspm	correct letter sounds per minute
cnwpm	correct non-words per minute
cwpm	correct words per minute
DAT	District Advocacy Team
EARC	Education Assessment and Research Centre
EGMA	Early Grade Mathematics Assessment
EGRA	Early Grade Reading Assessment
EMIS	education management information system
EQUALL	Education Quality for All (project)
FCUBE	Free and Compulsory Universal Basic Education
GDP	gross domestic product
GES	Ghana Education Service
MOE	Ministry of Education
NALAP	National Literacy Acceleration Programme
NEA	National Education Assessment
NEAU	National Education Assessment Unit (formerly ASU)
NESAR	National Education Sector Annual Review
P1 through P6	primary grades 1 through 6
RTI	RTI International (trade name of Research Triangle Institute)
SEA	School Education Assessment
USAID	United States Agency for International Development

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I. Introduction

Ghana's commitment to primary education is reflected in dramatic improvements to access. Enrolment in primary education has almost doubled in the past 15 years following the introduction of Free and Compulsory Universal Basic Education, or 'FCUBE' (i.e., 2.5 million in 1999/2000 school year to 4.45 million in 2011/2012), with a 40% estimated increase in net enrolment rate in the past decade (i.e., 58% in 2003/2004 to 82% in 2011/2012).¹ In the past decade, education has accounted for 18–27% of public expenditure, or approximately 5–6% of Ghana's gross domestic product (GDP). The sector has seen steady growth from 5.6% of the GDP in 2003 to 6.3% in 2011.²

In May 2012, the Ministry of Education (MOE) held its 8th National Education Sector Annual Review (NESAR 2012). The recommendations emerging from the NESAR 2012 clearly underscored the importance of promoting the use of data as the driver for advancing the education sector goals. They emphasised the use of achievement data at all levels of the system, particularly at the district and school levels. The recommendations related to basic education stressed the importance of districts' capacity to apply achievement information in their strategic planning and management of schools as well as the importance of developing mechanisms for schools themselves to generate practical pupil achievement information and to use these data to track progress against specific standards.

The basic education technical working group at the NESAR 2013 emphasised better enforcement of the language-of-instruction policy and made several recommendations along this line to the MOE and GES. Related issues included more teacher training in mother-tongue instruction and deployment of teachers to areas where they speak the local language, sustainable/strategic textbook and supplementary book supplies, and targeted improvement in early childhood education.

The government's policy on language of instruction has changed many times over several decades. For a long stretch of time—from 1925 to 1951—the policy was very similar to its current articulation, with Ghanaian languages being used through primary 3, before the language of instruction transitioned to English in grade 4.³ Once Ghana gained independence in 1957, the policy vacillated between English only and Ghanaian language in the early primary grades. More recently, from 2002 to 2009, the government mandated English-only instruction. This changed again with a new government and the introduction of the National Literacy Acceleration Programme (NALAP) through a partnership between the Ghana Education Service (GES) and the United States Agency for International Development (USAID) as part of the Education Quality for All (EQUALL) project.⁴

¹ Darvas, P., & Balwanz, D. (2013). *Basic education beyond Millennium Development Goals in Ghana*. Washington, DC: World Bank. <https://openknowledge.worldbank.org/handle/10986/16307>

² Some of the background information in this section was developed for shared use in this document and a parallel report: Ministry of Education, Ghana Education Service, National Education Assessment Unit. (2013, December). *Ghana National Education Assessment: 2013 findings report—Draft*. Prepared with funding from the USAID Education Data for Decision Making (EdData II) project, led by RTI International, Task Order No. AID-641-BC-13-00001. Accra: NEAU.

³ The six primary grades in Ghana are also referred to as P1 through P6.

⁴ Okofo, A. (2013). "If you've got a mother tongue, please use it": The language of education situation in Ghana. *International Journal of Innovative Research and Studies*, 2(5), 407–409.

NALAP provides for instruction in the predominant Ghanaian language of the local community through grade 3, with English introduced gradually in the early grades, and pupils making the full transition in grade 4. By grade 4 the programme assumes pupils will have first become fluent speakers and readers of the Ghanaian language of instruction, followed by English. The EQUALL project developed NALAP teaching and learning materials for the early grades in the 11 officially recognised Ghanaian languages of instruction: Akuapem Twi, Asante Twi, Dagaare, Dagbani, Dangme, Ewe, Fante, Ga, Gonja, Kasem, and Nzema. The project also included an in-service teacher training component.

Purpose of the 2013 Early Grade Reading and Mathematics Assessments

Before 2013, education stakeholders in Ghana had little rigorous national-level data on literacy and numeracy learning outcomes in the early grades—a crucial period of development and preparation for later schooling. While the School Education Assessment (SEA) has been administered in primary grades 2, 4, and 6, it was not meant to be a nationally representative test, but rather was designed as a diagnostic tool at the school level.⁵ The earliest national measure available was the National Education Assessment (NEA), administered at the end of primary 3 and primary 6. A paper-and-pencil, multiple-choice test given only in English, the NEA assumes a literate pupil population and was not designed to provide data on non-readers, emerging readers, or reading fluency rates. After the return to a policy of using Ghanaian language for instruction and the introduction of NALAP, there has been no national-scale mechanism for measuring reading outcomes in Ghanaian languages.

To address this lack of information, USAID and the Ghana Education Service forged the Ghana Partnership for Education, and made *Testing* a key component of the relationship. In addition to continuing with the biennial administrations of the NEA, the GES and USAID agreed to also conduct an Early Grade Reading Assessment (EGRA) to assess reading skills in 11 Ghanaian languages and in English, as well as to conduct an Early Grade Mathematics Assessment (EGMA).

Mathematics is a skill very much in demand in today's economy and competitive jobs require some level of mathematical skills. Moreover, the problem-solving skills and mental agility that children develop through mathematics transfer to other areas of life and work. It is, therefore, critical that countries monitor the progress of pupils in mathematics and in particular the foundation for the subject that is established in the early grades. The NEA—administered in 2005, 2007, 2009, 2011, and most recently in July 2013—has shown not only that children in Ghana have struggled to read, but also that performance in mathematics has lagged behind grade expectations, with the percentages of P3 and P6 pupils achieving proficiency in mathematics falling below 20% (i.e., 18.2 for P3 and 16.1% for P6 in 2013). Thus, in designing the *Testing* activity, the GES was interested in learning more about pupils' basic skills in early grade mathematics through the EGMA. The rationale behind the use of this instrument is that a strong foundation in mathematics established during the early grades is crucial for success in mathematics in the later years.

⁵ United Nations Educational, Scientific and Cultural Organization, International Bureau of Education (UNESCO-IBE). (2010). *World data on education, VII Ed., 2010/11: Ghana*. New York: UNESCO-IBE. http://www.ibe.unesco.org/fileadmin/user_upload/Publications/WDE/2010/pdf-versions/Ghana.pdf

Structure of This Report

The main body of this report first describes the assessment instruments used and the sampling framework and design. This background is followed by an explanation of the process of preparing for data collection, a description of pupil and school characteristics, an analysis of common themes from the EGRA and EGMA findings at the national level and by geographic designation. These themes will provide education stakeholders in Ghana with an overall picture of learning outcomes in reading and mathematics at the end of primary 2. The report also discusses key factors from the study that were found to be correlated with better pupil performance. The main body of the report ends with some brief conclusions, followed by a set of policy and action recommendations that emerged from the dialogue at the National Policy Forum in February 2014 and the 12 District Cluster Forums that preceded it. The annexes of the report analyse in more detail the findings by individual language.

About the Early Grade Reading Assessment Tool

In November 2006, USAID and the World Bank supported RTI and a team of reading experts to develop a 15-minute, individual oral assessment of five core skills that are considered to be the building blocks of reading: phonemic awareness, alphabets, fluency, vocabulary, and comprehension. The purpose was to give countries a rapid assessment tool for systematically measuring how well children read in the early grades. The resulting tool became known as the Early Grade Reading Assessment, or EGRA, which translates the five core skills into observable tasks: recognising letters of the alphabet, distinguishing sounds within words, reading simple words, and understanding sentences and paragraphs. Because the assessment components are aligned with essential and teachable reading skills, the results provide clear guidance for changing instructional methods and offer hope of improvement. Measurements of how quickly and accurately children can read a text out loud, and how much of it they understand, also align with a scientific and a popular understanding of what it means to be able to read.

The standard instrument, however, must always be adapted to the context and language(s) of the country of administration. Thus, an instrument development workshop was conducted over two weeks in Ghana in February 2013, involving the Ghana Education Service and language specialists from around the country, and served to ensure that the instruments used for this exercise:

- were culturally appropriate
- corresponded to the grade-level material pupils were expected to be able to read
- reflected the way the language was being used locally in reading materials for the target grade level
- took into consideration the linguistic structure of the language.⁶

EGRA instruments were developed in the following languages:

1. Akuapem Twi
2. Asante Twi
3. Dagaare

⁶ Although the EGRA has been administered in multiple countries, comparison of reading performance between countries and languages is discouraged due to linguistic differences.

- | | | |
|------------|----------|-------------|
| 4. Dagbani | 7. Ga | 10. Kasem |
| 5. Dangme | 8. Gonja | 11. Nzema |
| 6. Ewe | 9. Fante | 12. English |

The instruments developed were pilot tested in 55 schools with 1,296 pupils and analysed using ‘Rasch analysis’ to ensure that the items measured a range of skills and were neither too easy nor too hard for the target population. The final instruments included the subtasks summarised in *Table 1*.

Table 1: EGRA instrument subtasks in Ghana

Subtask	Skill	Description The child is asked to...
Listening comprehension	Oral language comprehension and vocabulary	...listen to a story that the assessor reads out loud, then verbally answer 3 questions about the story.
Letter-sound identification	Alphabetic principle—letter-sound correspondence	... say the sound each letter makes, while looking at a printed page of 100 letters of the alphabet in random order, upper and lower case. Timed.
Non-word reading	Alphabetic principle—letter sound correspondence and Fluency—automatic decoding	... read a list of 50 non-words printed on a page. Timed. Words were constructed from actual orthography, but were not real words. For example ‘jaf,’ ‘tob’.
Oral passage reading	Fluency—automatic word reading in context	...read a grade-level appropriate short story out loud printed on a page. Timed.
Reading comprehension	Comprehension	... verbally respond to 5 questions that the assessor asks about the short story.

These subtasks can be characterised as ‘fluency’ measures based on whether they are timed or untimed. A timed subtask is administered over a one-minute period during which the child responds to as many items in the subtask as possible. The assessor notes which letters or words are read incorrectly, and at the end of a minute, the assessor notes how many items the child attempted in the time available. The result is calculated and expressed as ‘correct items per minute.’ Non-fluency subtasks include untimed sets of questions. The results are calculated and expressed as ‘percentage of items correct out of items attempted’.

In general, for the EGRA, pupils were assessed in English and in the GES-designated language of instruction at that school. The GES-designated language of instruction is determined by the predominant Ghanaian language of the immediate locality. About 15% of the pupils sampled were assessed with the English EGRA only, because their schools were not assigned a Ghanaian language by the GES. In general, the time it takes to administer the EGRA to an individual pupil is about 10 minutes.

In addition to the reading and mathematics assessments, children were also asked a series of questions about their home and school environment, such as whether they had attended pre-school or kindergarten, spent time practising reading at school and at home, had access to reading materials, had help with homework from a family member, or had been absent from

school recently. Assessors also asked children to show their textbooks and exercise books, in order to determine resource availability and use. These questions were designed to gather contextual information that could provide further insight into variations in performance on both the EGRA and EGMA.

About the Early Grade Mathematics Assessment Tool

The Early Grade Mathematics Assessment was designed to provide information about basic mathematics competencies—those competencies which should typically be mastered in the very early grades, and without which pupils will struggle, or potentially drop out in later years. Similar to the EGRA, the subtasks designed for the standard EGMA were drawn from extensive research on early mathematics learning and assessment and were constructed by a panel of experts in mathematics education and cognition. The conceptual framework for mathematical development on which the assessment is based is grounded in extensive research that has been conducted over the past 60 years.⁷ To develop the EGMA protocol, developers systematically sampled early numeracy skills, particularly those underlying number sense. These abilities and skills are key in the progression towards the ability to solve more advanced problems and the acquisition of more advanced mathematics skills.⁸

The subtasks in the EGMA instrument were developed according to several criteria, in order to support the goal of providing stakeholders, from ministries of education to aid agencies, and to local education officials, with the information essential to making informed decisions with regard to teacher education and support, curriculum development, and implementation. These include the expectation that the tasks:

- represent skills that developing country and developed country curricula have determined should be acquired in early grades;
- reflect those skills that are most predictive of future performance, according to available research and scientific advice;
- represent a progression of skills that lead toward proficiency in mathematics;
- target both conceptual and computational skills; and
- represent skills and tasks that can be improved through instruction.

Like the EGRA, the EGMA is an individually administered oral test, which allows for the targeted skills to be assessed without confounding problems with language or writing that might impede performance in mathematics. Furthermore, by administering the test orally, administrators can better ensure that pupils understand instructions by using a language and dialect that the child being assessed knows. In the case of the Ghanaian EGMA, assessors administered the test in either the language of the local community (that is, the language of

⁷ For example: (1) Baroody, A. J., Lai, M.-L., & Mix, K. S. (2006). The development of number and operation sense in early childhood. In O. Saracho & B. Spodek (Eds.), *Handbook of research on the education of young children* (pp. 187–221). Mahwah, New Jersey, USA: Erlbaum. (2) Chard, D. J., Clarke, B., Baker, S., Otterstedt, J., Braun, D., & Katz, R. (2005). Using measures of number sense to screen for difficulties in mathematics: Preliminary findings. *Assessment for Effective Intervention*, 30(2), 3–14. (3) Clements, D., & Samara, J. (2007). Early childhood mathematics learning. In F.K. Lester, Jr. (Ed.), *Second handbook on mathematics teaching and learning* (pp. 461–555). Charlotte, North Carolina, USA: Information Age.

⁸ Examples are Baroody, et. al. (2006); Clements & Samara (2007); and Foegen, A., Jiban, C., & Deno, S. (2007). Progress monitoring measures in mathematics: A review of literature. *The Journal of Special Education*, 41(2), 121–139.

instruction of the school at which the assessment was conducted) or in English, or in a combination of the two according to the needs of the child being assessed.

After the instrument adaptation workshop described elsewhere in this report, the final EGMA instrument included the subtasks summarised in *Table 2*.

Table 2: EGMA instrument subtasks in Ghana

Subtask	Skill	Description The child is asked to...
Subtasks that assess procedural (recall) knowledge		
Number identification	The ability to identify written number symbols. If pupils cannot identify numbers, they cannot do mathematics.	... say the names of numbers presented on a page with 20 numbers. The numbers ranged from one- to two- and three-digit numbers. Timed (one minute).
Addition and subtraction level 1 (basic facts)	Knowledge of and confidence with basic addition and subtraction. It is expected that pupils should develop some level of automaticity/fluency with maths facts such as these since they are foundational mathematics skills.	... solve addition/subtraction problems, with sums/differences below 20, without the aid of paper and pencil. The items ranged from problems with single digits only to problems that involved the bridging of the ten. ⁹ Ten items per addition and subtraction subtask. Timed (one minute).
Subtasks that assess conceptual (applied) knowledge		
Quantity discrimination (number comparison)	The ability to make judgements about differences by comparing quantities, represented by numbers.	... identify the larger of a pair of numbers. The number pairs used ranged from a pair of single-digit numbers to five pairs of double-digit numbers and four pairs of three-digit numbers. Ten items. Not timed.
Missing number (number patterns)	The ability to discern and complete number patterns.	... determine the missing number in pattern of four numbers, one of which is missing. Patterns used included counting forward and backward by ones, by fives, by tens and by twos. Ten items. Not timed.
Addition and subtraction level 2¹⁰	The ability to use and apply the procedural addition and subtraction knowledge assessed in the level 1 subtask to solve more complicated addition and subtraction problems.	... solve addition/subtraction problems that involve the knowledge and application of the basic addition and subtraction facts assessed in the level 1 subtask. Pupils were allowed to use any strategy that they wanted, including the use of paper and pencil supplied by the assessor. The problems extended to the addition and subtraction of two-digit numbers involving bridging. Five items per addition and subtraction subtask. Not timed.
Word problems	The ability to interpret a situation (presented orally to the pupil), make a plan and solve the problem.	... solve problems presented orally using any strategy that they wanted, including the use of paper and pencil and/or counters supplied by the assessor. The numerical values involved in the problem were deliberately small to allow for the targeted skills to be assessed without confounding problems with calculation skills that might otherwise impede performance. The problem situations used

⁹ 'Bridging the ten' refers to addition and subtraction situations where the addition and/or subtraction involves moving from one decade to the next. For example, $8 + 6$ and $28 + 6$ both involve 'bridging the ten'. A common strategy that may be adopted by children when bridging the ten mentally is first to 'make' or 'complete the ten'—e.g.: $8 + 6 = 8 + 2 + 4 = 10 + 4 = 14$, and $28 + 6 = 28 + 2 + 4 = 30 + 4 = 34$.

¹⁰ The addition and subtraction level 2 subtasks were more conceptual than the addition and subtraction level 1 subtasks because the pupils had to understand what they were doing, and apply the level 1 skills. In other words, while the level 2 subtasks were not purely conceptual—because with time and practise, pupils will develop some automaticity with the types of items in these subtasks—they were more conceptual than the level 1 subtasks, especially for primary 2 pupils.

Subtask	Skill	Description The child is asked to...
		were designed to evoke different mathematical situations and operations. Six items. Not timed.

For the timed subtasks, both accuracy (percentage of correct responses from the items attempted) and automaticity/fluency (number of correct responses per minute) scores were calculated and reported. For the untimed subtasks, only accuracy (percentage of correct responses per subtask) was calculated and reported.

The skills tested in the EGMA subtasks were skills with which Ghanaian pupils should have been familiar, given the curricular guidelines. The total time it takes, on average, to administer the EGMA to an individual pupil is approximately 15 minutes.¹¹

Sample Design

In response to GES requests, the sample was selected to be representative by language, region, deprived/non-deprived district,¹² urban/rural, and pupil gender. Only public (government) schools were included in the sample. Schools were stratified by region and then by predominant language taught within each region. The schools were then selected proportional to P2 pupil enrolment levels. Pupils were stratified by gender. Five boys and five girls—10 total—were to be randomly selected from each school. If there were fewer than five girls at any given school, all of the girls were automatically selected and more boys were sampled to obtain a total of 10 pupils (the same procedure was followed if there were fewer than five boys). As described above, randomly selected pupils were given three assessments on a one-on-one basis—EGRA Ghanaian language, EGRA English, and EGMA—plus the pupil questionnaire.

For proper representation at each level mentioned above, samples were drawn from 45 schools for a total of 450 pupils for each characteristic of the representative levels. The total required sample size was estimated to be 815 schools, and 8,150 pupils. A few more schools than minimally required were selected in case any were closed or unreachable during data collection. The actual count after data collection was 805 schools and 7,923 pupils. However, because of the oversampling that was done, the strength and validity were unaffected.

Table 3 illustrates the sample size by region and language of instruction based on education management information system (EMIS) 2010–2011 data.

¹¹ In Ghana, the average assessment time, including the English and Ghanaian language EGRAs, the EGMA, and the pupil questionnaire, was 38 minutes.

¹² **Note:** This does not mean that the sample was representative for *each* of the deprived districts. The representation was at the *combined* 57 deprived districts level and the 110 non-deprived district level. (Although Ghana has inaugurated an additional 42 districts, raising the total from 170 to 212 districts, these sample calculations are based on the 170 districts that were included in most recent the EMIS data set. Given the updated 2012 deprived district list, the sample size is sufficient to make appropriate inferences about the deprived districts for the following languages: Asante, Akuapem, Dagbani, Gonja, Kasem, and Dagaare.)

Table 3: 2013 sample sizes

Region	Designated language of instruction	Sampled schools
Ashanti		
	Asante Twi	45
	Total	45
Brong Ahafo		
	Asante Twi	45
	Total	45
Central		
	Asante Twi	25
	Fante	45
	Total	70
Eastern		
	English-only	10
	Akuapem Twi	45
	Dangme	25
	Ewe	5
	Total	85
Greater Accra		
	English-only	20
	Asante Twi	5
	Akuapem Twi	5
	Dangme	20
	Ewe	5
	Ga	45
	Total	100
Northern		
	English-only	25
	Asante Twi	5
	Dagbani	45
	Gonja	45
	Dagaare	10
	Total	130
Upper East		
	English-only	45
	Kasem	45
	Total	90
Upper West		
	English-only	5
	Dagaare	45
	Total	50
Volta		
	English-only	10
	Akuapem Twi	20
	Ewe	45

Region	Designated language of instruction	Sampled schools
	Total	75
Western	English-only	10
	Asante Twi	45
	Fante	25
	Gonja	45
	Nzema	10
	Total	125
	Total	

Assessor Training and Data Collection

International project staff spent one week in May 2013 training a group of 24 master trainers and supervisors, recruited from within the GES. These individuals were then sent in teams to four venues in Accra, Cape Coast, Kumasi, and Tamale, to train a total of 200 GES assessors over 8 days. Assessors received training on how to administer each subtask of the EGRA and EGMA, how to interact with pupils during the assessment as well as school staff, and how to properly implement the protocol for visiting the sampled schools and randomly selecting the pupils to be assessed. Assessors learned how to



Master trainers learning Tangerine®

operate handheld electronic tablet devices loaded with the Tangerine® software. This software, designed for education survey data collection, allowed assessors to gather all the data on the tablets rather than on paper, thus streamlining the data collection and data cleaning process. Assessors were trained in how to administer the tests as well as how to save and upload the finished assessments. On average, at the end of the training, the interrater reliability analysis findings revealed an average of 86% agreement among trainers within language groups, across instruments.

Data collection took place 2–12 July 2013. Pupils were given EGRA and EGMA stimulus sheets to respond to with guidance from the assessor, and the assessors scored the pupils' responses on the tablet. At the end of each school visit, assessors used a wireless router and modem to upload the collected data to a central server.

II. Pupil and School Characteristics

As was described earlier, the study collected a total of 7,923 completed pupil assessments, from 4,017 boys (51%) and 3,906 girls (49%).

Most of the schools in the sample (80.4%) were classified as rural, and nearly a third (32.1%) were in deprived districts.

Nearly half (49.2%) of the pupils assessed said they had been absent from school at least one day in the previous week. Most pupils (80.9%) said they had attended kindergarten or pre-school before beginning P1. However, while 7 to 8 years old is considered the standard age for P2 pupils, the majority (74.8%) of pupils were 'over age' for the grade, at 9 years or older. Additionally, only 12.1% of pupils reported that they were repeating the grade. This is an indication that while most pupils progress from one grade to the next, many children are beginning school at a later age than would be ideal.



To get a sense of the availability of teaching and learning resources among the sample population, assessors examined the materials belonging to the pupils they assessed and found that English and mathematics exercise books were the most common, with 80.6% of pupils having the former and 84.9% of pupils having the latter in their possession at school. Less common were textbooks and readers, with fewer than half having an English language reader (41.7%) or a mathematics textbook (42.7%). Fewer pupils (34.7%) possessed a reader in a Ghanaian language, although 57.6% of pupils had a Ghanaian language exercise book.

One way to measure the level of teacher engagement with pupils is by examining the extent to which pupils' exercise books have been marked by the teacher. Pupils whose teachers are very engaged with their schoolwork will have marks on most or all of the pages they have been assigned to complete. However, while 21.4% of pupils did not have an exercise book at all, those who did have exercise books were found to have at least some marks in their books. Still, only 17.8% had an exercise book with marks on all of the pages.

The lack of readers available to many pupils is cause for concern, as simply having exposure to reading materials and time for practising reading are two of the most basic and necessary elements for literacy acquisition: '[R]eading skills are self-reinforcing through practice both in and out of school: poor readers read about half as many words as good readers, thus getting half the amount of vocabulary practice and improving their reading skills at a slower rate.'¹³ In addition to most pupils not having English or Ghanaian language readers, less than a third (31.0%) of schools had a library. Consequently, only 34.7% pupils reported that they had read books on their own at school the day before.

'Daily reading is crucial for students to train their minds to automatically recognize the visual patterns of words and to begin comprehending what they read.'

Gove & Cvelich (2011), p. 28

Families can do a lot to help children learn to read, by modelling literacy by reading aloud, as well as by listening to children as they practise reading on their own (something even

¹³ Gove, A., & Cvelich, P. (2011). *Early reading: Igniting education for all. A Report by the Early Grade Learning Community of Practice* (Rev. ed). Research Triangle Park, North Carolina, USA: RTI Press. <http://www.rti.org/pubs/early-reading-report-revised.pdf>, p. 7.

illiterate family members can do to encourage reading). A few pupils (8.2%) said that someone at home read to them every day, while 29.1% said no one ever read to them. When asked how often they themselves read aloud at home, 6.3% of pupils said they read every day and 40.8% said they never did. These reports are not surprising given that only a few pupils (21.6%) said they brought reading books home from school, and 32.0% of pupils said that there were reading materials other than schoolbooks in their home.

III. EGRA Outcomes

Overview of EGRA Trends

The 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.¹⁴

Listening Comprehension

The listening comprehension subtask measured oral language comprehension and vocabulary. This is a pre-reading skill, and there is a strong link between a child's ability to speak and understand a language and his or her ability to learn to read in that language.¹⁵ Across the Ghanaian languages, the percentage of pupils scoring zero on the listening comprehension subtask varied. However, for each of the Ghanaian languages, the percentage of pupils scoring zero was less than one half. This means that the majority of pupils were able to answer at least one comprehension question correctly about a grade level appropriate story they had listened to in a Ghanaian language. Three-quarters (74.9%) of the pupils scored zero on the English listening comprehension subtask, meaning that after listening to a grade level appropriate short story in English, they could not answer a single question about the story correctly. If the children were more accustomed to hearing and speaking a Ghanaian language than they were to hearing and speaking English, these results are not surprising.

Letter-Sound Identification

The letter sound identification subtask measured pupils' phonemic awareness. Each pupil was shown 100 letters—both upper- and lower case, arranged in a random sequence—and was asked to identify the sound of as many letters as quickly as they could within one minute. If the child gave the name of the letter instead of the sound, failed to say anything at all, or gave

¹⁴ '...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.

¹⁵ Scarborough, H. S. (2009). Connecting early language and literacy to later reading (dis) abilities: Evidence, theory, and practise. In F. Fletcher-Campbell, G. Reid, & J. M. Soler (Eds.), *Approaching difficulties in literacy development: Assessment, pedagogy and programmes* (pp. 23–38). London: Sage.

the wrong sound, the item was marked as incorrect. The skill measured by this subtask is a strong predictor of future reading ability.¹⁶

Across the Ghanaian languages, the average performance on the letter sound knowledge subtask was low, with the highest average score being 39.2% correct for Akuapem Twi (at a fluency rate of 14.7 correct letter sounds per minute [clspm]) and the lowest average score being 6.1%¹⁷ for Kasem (at a fluency rate of 1.7 clspm). Among the languages spoken in the north, as well as for English (at the national level), more than 50% of the pupils scored zero on this subtask, whereas across the other languages, the percentage zero scores were lower, with the lowest being 16.1% for Dangme.

By the end of P2, children should know the sounds of letters automatically, without having to think or hesitate for an instant. In fact, this is the skill that is required to become a fluent reader. At a fluency rate of 1 letter sound per second—which is still relatively hesitant—a child should be able to *attempt* at least 60 letter sounds in a minute. With a 10% error rate, that would still be a letter-sound fluency of 50 letters per minute. However, these results show that the highest-performing pupils in Ghana spent almost 3 seconds, on average, on each letter before giving the sound (a fluency rate of 22 clspm), and had an error rate of more than 40%. The lowest-performing pupils spent over 9 seconds per letter, on average.¹⁸

The trend across languages was that letter sound production was not yet fluent for most pupils. Instead, they were having to spend time thinking about each letter.

Non-word Decoding

The non-word decoding subtask measured pupils’ ability to decode words and blend letter sounds together to say words. Each pupil was shown 50 non-words, mostly 3 letters in length. The pupil was given one minute to read as many non-words as possible. Although the non-words were not real words in the language of the assessment, they did follow the structure and orthography of the language, so they were plausible words. Using non-words enables a more accurate measurement of children’s ability to decode, because they are not able to read words they have already stored in their vocabulary and learned to recognise by sight.

Across the languages, the vast majority of pupils scored zero on this subtask. The highest average correct score of any language was 17.2% for Ewe (at a fluency rate of 6.3 correct non-words per minute [cnwpm]) and the lowest was 1.7% correct for Kasem (at a fluency rate of 0.5 cnwpm). When pupils who scored zero were removed from the analysis, the highest average score was 61.4% correct for Asante Twi (at a fluency rate of 18.7 cnwpm) and the lowest was 36.9% correct for Kasem (at a fluency rate of 10.0 cnwpm).

yóm	tén	ñĕn
fòŋ	vín	wim
ɖɔŋ	sín	kĕm

¹⁶ Adams, M. J. (1990). *Beginning to read: Thinking and learning about print*. Cambridge, Massachusetts, USA: Massachusetts Institute of Technology (MIT) Press.

¹⁷ Here and throughout, scores reported reflect the average percentage correct out of those attempted.

¹⁸ When pupils who scored zero were removed from the analysis, the highest average score was 58.6% correct with a fluency of 22.0 clspm in Akuapem Twi, and the lowest was 22.9% correct with a fluency of 6.4 clspm in Kasem.

The trend across languages was that most pupils struggled to decode and read unfamiliar words. This is a fundamental skill for reading: Readers will always encounter new vocabulary that they must be able to decode.

Oral Passage Reading

The oral passage reading subtask measured pupils' oral reading fluency with connected text. Each pupil was shown a grade level appropriate short story and given one minute to read as much of the passage as possible.

When children start to read connected text, they initially employ most of their cognitive resources in decoding and saying the individual words of the text. At this stage their short-term memory is almost entirely engaged in the production of words, leaving almost no resources for the pupil to use to process the meaning of the text. As pupils gain some degree of reading fluency, they use less short-term memory for decoding and producing individual words and start using some of the available memory to engage with the meaning of the text. Thus, fluency in reading connected text is a prerequisite for comprehension.

Across all the languages, there were very high percentages of zero scores in oral passage reading. For each Ghanaian language, more than half of the pupils assessed could not read a single word of the story. In six out of the 11 Ghanaian languages included in the EGRA, more than 80% of pupils scored zero on this subtask.

Average scores for all pupils ranged from a high of 19.1% correct for Ewe (with a fluency rate of 8.1 correct words per minute [cwpm]) to a low of 3.6% correct for Kasem (1.3 cwpm).

Among those who did not score zero (i.e., those who read at least one word correctly), the average scores by language ranged from a high of 63.0% correct for Gonja (with a fluency rate of 19.8 cwpm, or about 3 seconds per word) to a low of 36.2% correct for Dangme (11.3 cwpm, or about 5.3 seconds per word).

The average fluency rates across all languages were lower than what is generally necessary to read with comprehension. There is no single fluency rate that is a standard for all languages, because languages can vary greatly, but in general across many languages, fluency rates that correspond with comprehension tend to be in the range of *at least* 40 cwpm to 60 or more.

Reading Comprehension

The reading comprehension subtask measured pupils' ability to understand the text that they had read aloud, and as such was directly connected to the oral passage reading subtask. For each short story used in the oral passage reading subtask, there were five questions that pupils could answer only by reading the story. Once the oral passage reading subtask was completed (either the 60 seconds of time had elapsed or the pupil finished reading the entire passage), the assessor asked the pupil the comprehension questions, but only those that corresponded to the portion of the story passage the pupil was able to read. Thus, if the pupil was able to read only the first sentence of the passage before the time finished, the assessor would ask the pupil only the first question. The first questions assessed direct recall, and the later questions were inferential in nature.

Considering that few pupils were able to read a single word (i.e., high percentages of zero scores on the oral passage reading subtask), it is no surprise that the zero score percentages for the reading comprehension subtask also were very high. For the majority of language groups, more than 90% of the pupils scored zero.

In 10 of the 12 languages assessed (including English), fewer than 12% of pupils could correctly answer at least one of the five comprehension questions (i.e., scored above zero).

The trend evident here and in the results from the other subtasks was that most pupils in Ghana were not yet able to read with fluency and accuracy, and this prevented them from reading with comprehension. These pupils generally lacked the pre- and early-reading skills they will need to build in order to become strong, fluent readers who understand the text. Although there were some variations among the languages, this trend of pupils struggling with letter sounds, decoding, and comprehending was apparent no matter what the language of instruction was.

EGRA Results by Gender

Differences in performance between boys and girls were very minimal across the EGRA subtasks, with boys performing only slightly better than girls. The differences in performance were not statistically significant.

EGRA Geographic Variations

Pupils' EGRA performance by geographic location varied to greater or lesser degrees depending on the EGRA subtask, with pupils in the three northern regions of Ghana consistently showing lower performance than those in the rest of the country; pupils in the deprived districts (as a single sub-population) performing lower than pupils in non-deprived districts; and pupils in urban settings performing better than those in rural settings.

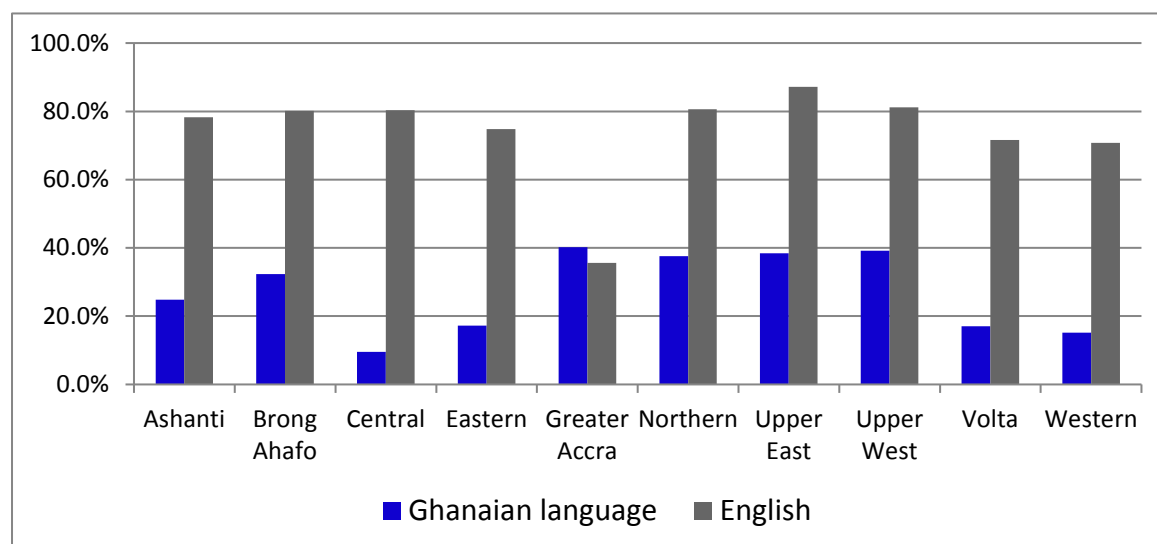
A survey of zero score percentages can convey general trends in performance by giving insight into what percentage of the sample population is unable to answer any subtask items correctly.¹⁹ The series of graphs below shows that while pupils struggled much more to understand *oral* English language than oral Ghanaian language (listening comprehension), when it came to understanding *written* English or Ghanaian language, they struggled similarly (reading comprehension), with the vast majority scoring zero. Given that in general, pupils appear to have had more exposure to English text than Ghanaian language text in school (see Pupil and School Characteristics section), it is possible that there were more familiar and recognisable words in the English oral reading passage than in their respective Ghanaian language reading passages. To score above zero, a pupil needed only read at least *one* word correctly. (For example, words such as 'no' and 'is', both of which are in the first sentence of the English reading passage, may have been more familiar and recognisable to pupils than similarly short or basic words in a Ghanaian language). The high percentages of zero scores for all languages on the non-word decoding subtask, however, reveal that many of these pupils had not yet learned what to do when they encountered unfamiliar words.

¹⁹ Reporting of zero score percentages by region reflects all languages in the region. While the graphs in this section are useful for visualising broad trends across regions, it should be noted that (1) linguistic differences between languages within a region and across regions could impact zero score percentages; and (2) it is not appropriate to compare actual (non-zero) scores across languages within or across regions.

Listening Comprehension

In *Figure 1*, zero score percentages for the listening comprehension subtask are displayed by region for Ghanaian language and for English. Clearly, in all regions, pupils struggled more to comprehend oral language in English than in a Ghanaian language.

Figure 1: Listening comprehension—Percentage of pupils scoring zero, by language and region



Zero score percentages for the listening comprehension subtask by urban/rural and non-deprived/deprived district are presented in *Table 4*.

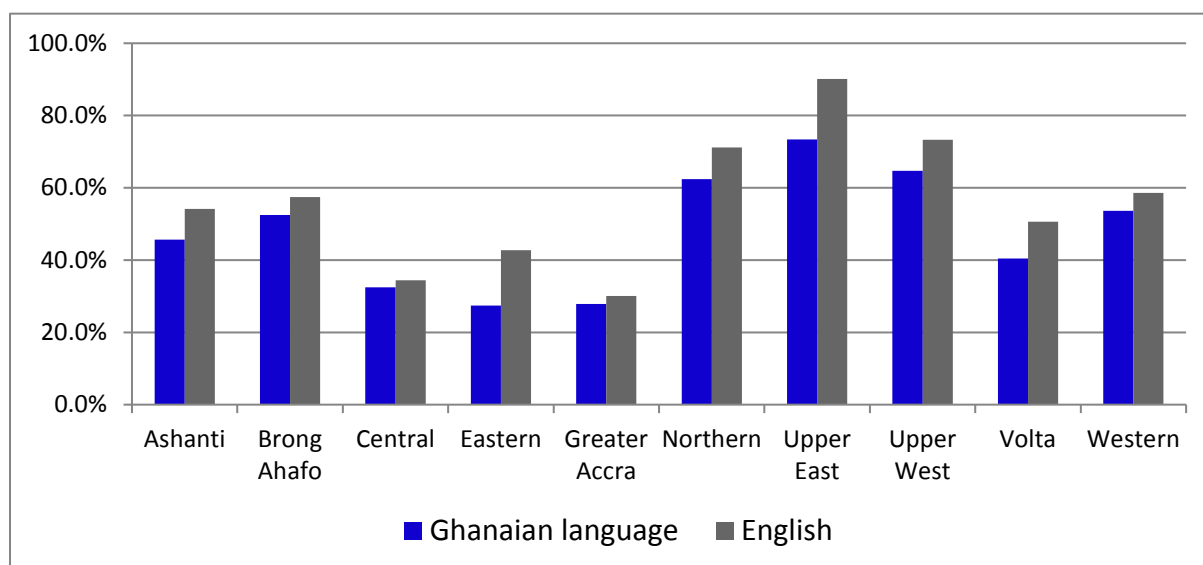
Table 4: Listening comprehension—Percentage of pupils scoring zero, by economic status and urban/rural population

Status	Ghanaian language	English
Non-deprived district	19.0%	70.4%
Deprived district	40.2%	82.8%
Urban	22.6%	55.1%
Rural	27.0%	81.7%

Letter-Sound Knowledge

In *Figure 2*, zero score percentages for the letter-sound knowledge subtask are displayed by region for Ghanaian language and for English.

Figure 2: Letter-sound knowledge—Percentage of pupils scoring zero, by language and region



Zero score percentages for the letter-sound knowledge subtask, by whether the school location was in an urban or rural setting, and whether the school was in a deprived district, are presented below in *Table 5*.

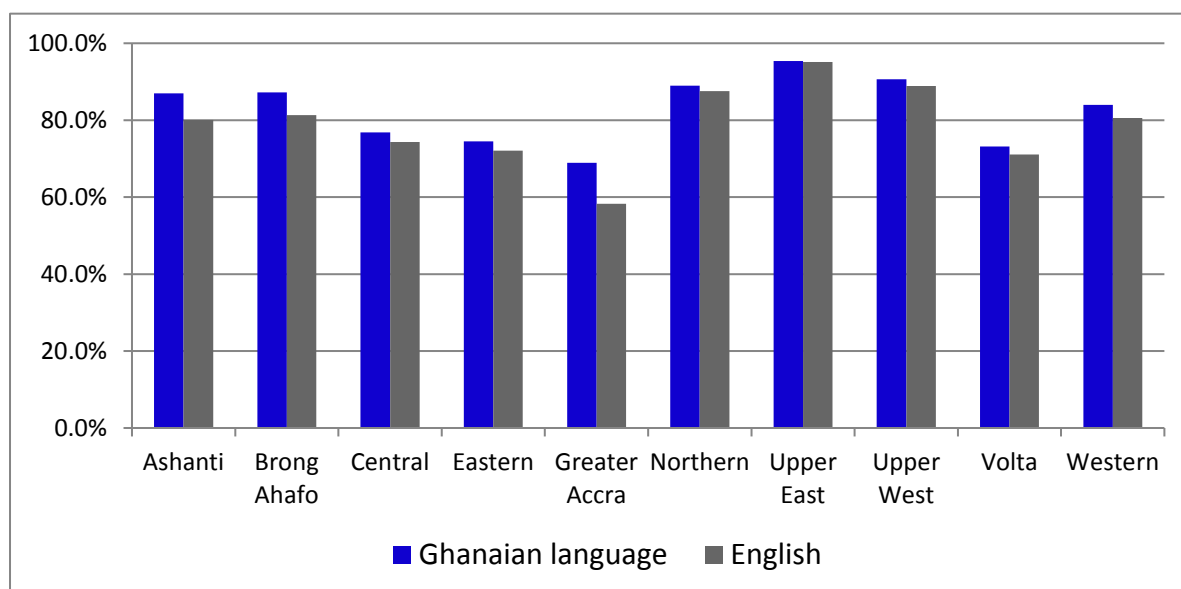
Table 5: Letter-sound knowledge—Percentage of pupils scoring zero, by economic status and urban/rural population

Status	Ghanaian language	English
Non-deprived district	37.8%	45.2%
Deprived district	64.7%	75.9%
Urban	35.5%	38.9%
Rural	51.8%	63.3%

Non-word Decoding

In *Figure 3*, zero score percentages for the non-word decoding subtask are displayed by region for Ghanaian language and for English.

Figure 3: Non-word decoding—Percentage of pupils scoring zero, by language and region



Zero score percentages for the non-word decoding subtask by urban/rural and non-deprived/deprived district are presented in *Table 6*.

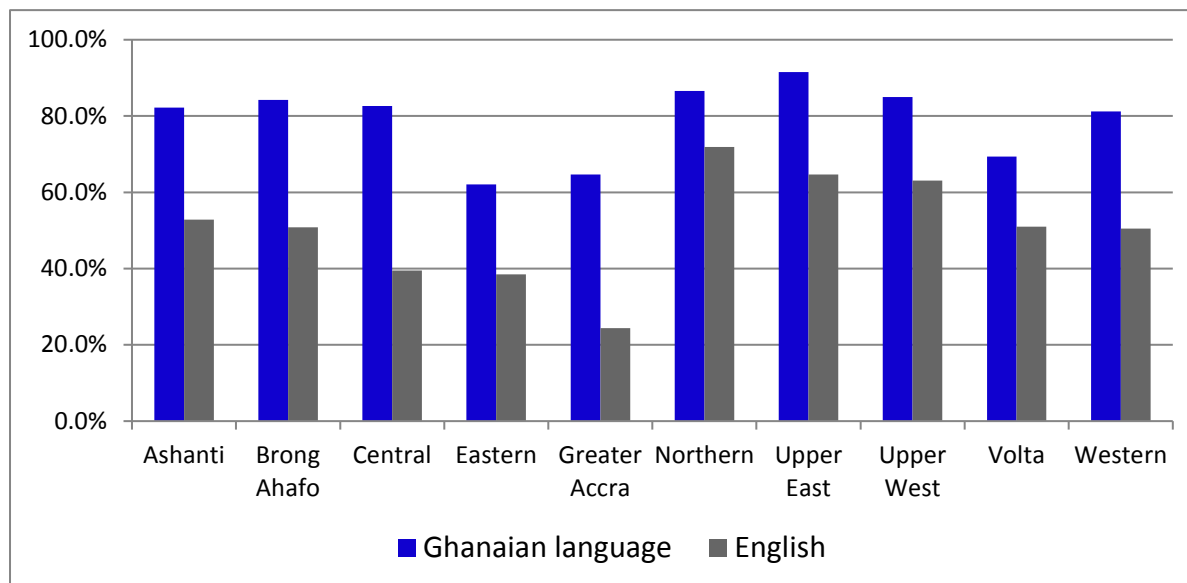
Table 6: Non-word decoding—Percentage of pupils scoring zero, by economic status and urban/rural population

Status	Ghanaian language	English
Non-deprived district	78.1%	73.4%
Deprived district	92.2%	89.9%
Urban	73.2%	66.2%
Rural	85.9%	83.9%

Oral Passage Reading

In *Figure 4*, zero score percentages for the oral passage reading subtask are displayed by region for Ghanaian language and for English.

Figure 4: Oral passage reading—Percentage of pupils scoring zero, by language and region



Zero score percentages for the oral passage reading subtask by urban/rural and non-deprived/deprived district are presented in *Table 7*.

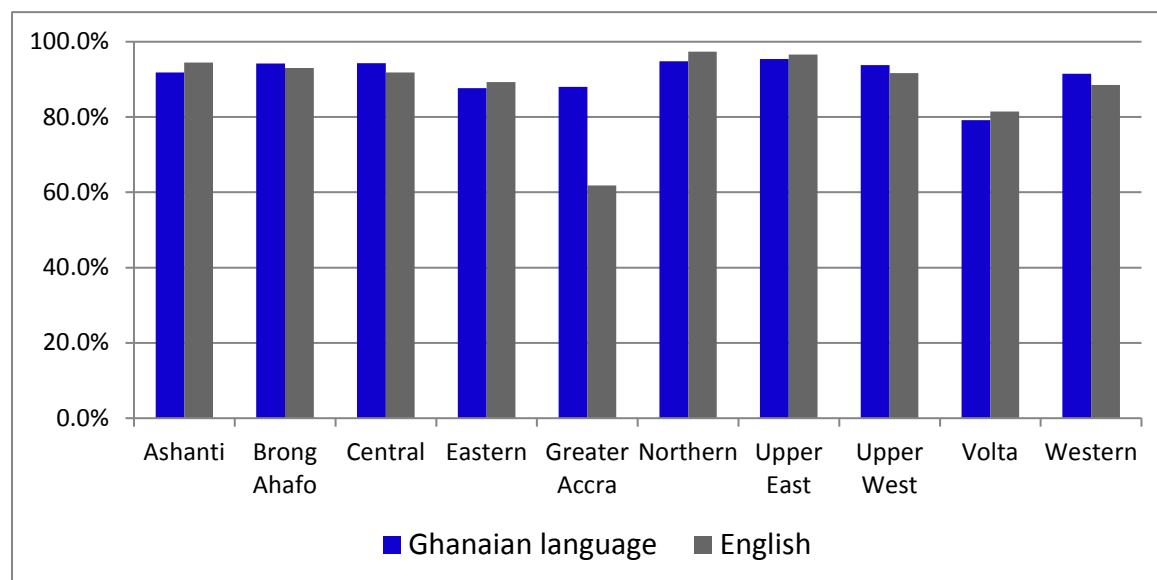
Table 7: Oral passage reading—Percentage of pupils scoring zero, by economic status and urban/rural population

	Ghanaian language	English
Non-deprived district	74.0%	42.7%
Deprived district	89.5%	68.1%
Urban	68.7%	31.7%
Rural	83.2%	59.2%

Reading Comprehension

In *Figure 5*, zero score percentages for the reading comprehension subtask are displayed by region for Ghanaian language and for English.

Figure 5: Reading comprehension—Percentage of pupils scoring zero, by language and region



Zero score percentages for the reading comprehension subtask by urban/rural and non-deprived/deprived district are presented in *Table 8*.

Table 8: Reading comprehension—Percentage of pupils scoring zero, by economic status and urban/rural population

Status	Ghanaian language	English
Non-deprived district	89.1%	85.8%
Deprived district	95.7%	97.2%
Urban	88.8%	76.6%
Rural	91.8%	93.9%

What do we know about pupils who can read?

The EGRA results clearly show that reading performance among P2 pupils in Ghana was very low. Most pupils could not read with comprehension. However, a few of the pupils assessed could read, and it is very instructive to examine the characteristics of this sub-population to learn what sets them apart from the majority.

The EGRA results in Ghana showed that pupils who could read²⁰ were significantly more likely to:

- Attend school regularly
- Be able to pronounce the sounds of individual letters
- Be able to combine letter sounds to read words
- Spend time at school reading on their own
- Have resources they needed at school—textbooks and exercise books
- Have teachers who engaged with their school work and marked their exercise books
- Have books and practise reading out loud at home
- Have someone at home who read to them.

These characteristics were found to be significantly correlated with reading ability even when pupils in the highest economic status category were removed from the analysis, meaning that wealth alone does not explain the results.²¹

IV. EGMA Outcomes

Overview of EGMA Trends

The overall results for the EGMA are summarised in *Table 9* and *Figure 6*. The EGMA showed that by the end of primary 2, pupils were doing reasonably well on the most procedural items—number identification, addition level 1 and subtraction level 1—with pupils scoring on average nearly 50% or better on these subtasks. That said, the pupils did better on addition level 1 than on subtraction level 1, with nearly 20% of the pupils unable to answer a single subtraction level 1 item correctly—the easiest of these items being: $4 - 1 = \square$. When it came to the more conceptual items, the pupils still fared reasonably well on the quantity discrimination subtask. However, on the missing number, addition level 2 and subtraction level 2 subtasks, there was a sharp drop-off in performance, with nearly 70% of the pupils 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 you have to know the answer rather than having a strategy for developing it: mathematics as the memorisation of facts, rules and procedures.

²⁰ For this logistical regression analysis, ‘pupils who can read’ were defined as those whose oral reading fluency score was 20 clspm or greater. This score was selected because it corresponded with pupils’ ability to correctly answer at least some comprehension questions, meaning that these pupils were able to read with enough fluency and accuracy to understand what they read. The *p*-value for each factor listed is .01 or less.

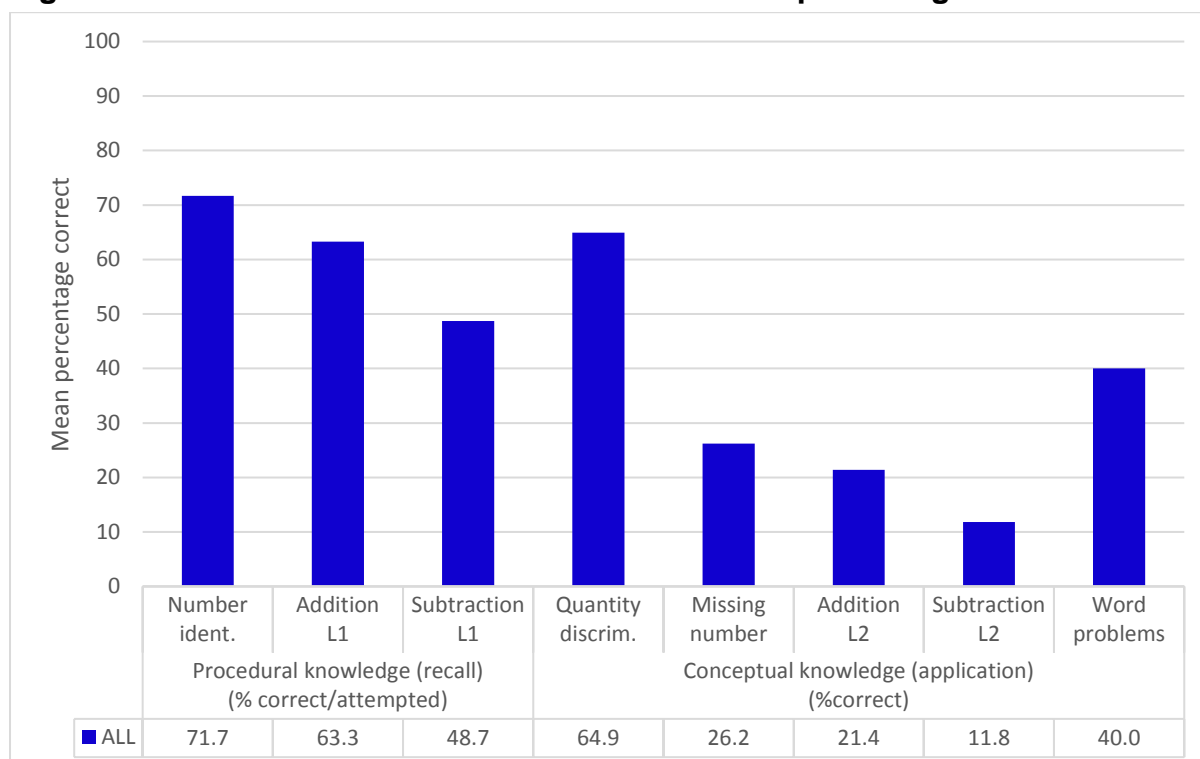
²¹ During administration of the pupil questionnaire, each sampled pupil was asked a series of questions about his or her family’s assets (such as what vehicles they have, the source of their drinking water, where they cook food and what fuel they use, whether they have electricity, etc.). Pupils’ answers provided information that was used to approximate the economic status of their family.

Table 9: Performance on EGMA subtasks—Mean percentage correct

	No. correct / minute	% correct / attempted	% correct / total	% zero scores
Number identification‡	18.3	71.7%		0.6%
Addition (level 1) ‡	8.9	63.3%		8.1%
Subtraction (level 1) ‡	6.1	48.7%		19.3%
Quantity discrimination			64.9%	3.5%
Missing number			26.2%	7.6%
Addition (level 2)			21.4%	50.6%
Subtraction (level 2)			11.8%	69.9%
Word problems			40.0%	9.1%

‡ These tasks were timed, and the means reported for these subtasks are the mean number of correct responses in terms of the number of items attempted. For all other subtasks, the means reported represent the number of correct responses in terms of the number of items.

Figure 6: Performance on EGMA subtasks—Mean percentage correct



While it is tempting in the early grades to teach mathematics as facts and rules to be memorised, the Ghanaian EGMA results show very clearly the limitations of this approach. In the early grades (primary 1) it will appear to teachers, parents and others that children ‘know their mathematics’. In terms of the curricular expectations for primary 1, and even much of primary 2, which are in very low number ranges, pupils will appear to ‘do well’ since they will ‘know the answers’. As the number ranges in which pupils are expected to do

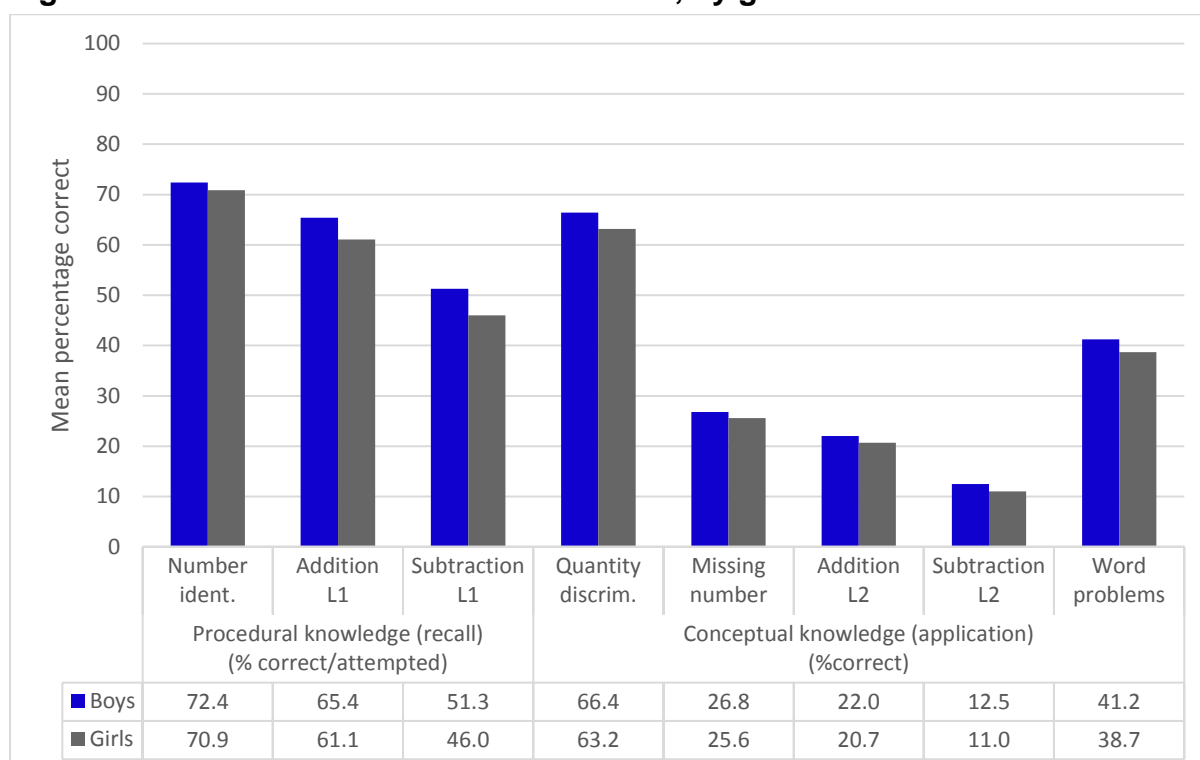
mathematics increase over the years, however, it is no longer possible to memorise all the answers. Pupils need to be able to apply the so-called ‘basic facts’ (assessed in the addition and subtraction level 1 subtasks) with fluency, flexibility and understanding to perform more complex tasks (assessed here in the addition and subtraction level 2 subtasks). The sharp drop-off in performance and the dramatic increase in zero scores from the level 1 to the level 2 tasks suggests that these pupils did not know the level 1 facts with understanding and hence were unable to apply them to solve the level 2 tasks.

The seemingly reasonable performance on the word problem subtask is discussed further in the detailed subtask analysis that follows.

EGMA Results by Gender

The overall results by gender for the EGMA are summarised in *Figure 7*. While across the subtasks the boys appear to have performed better than the girls, the differences are not statistically significant.

Figure 7: Performance on EGMA subtasks, by gender



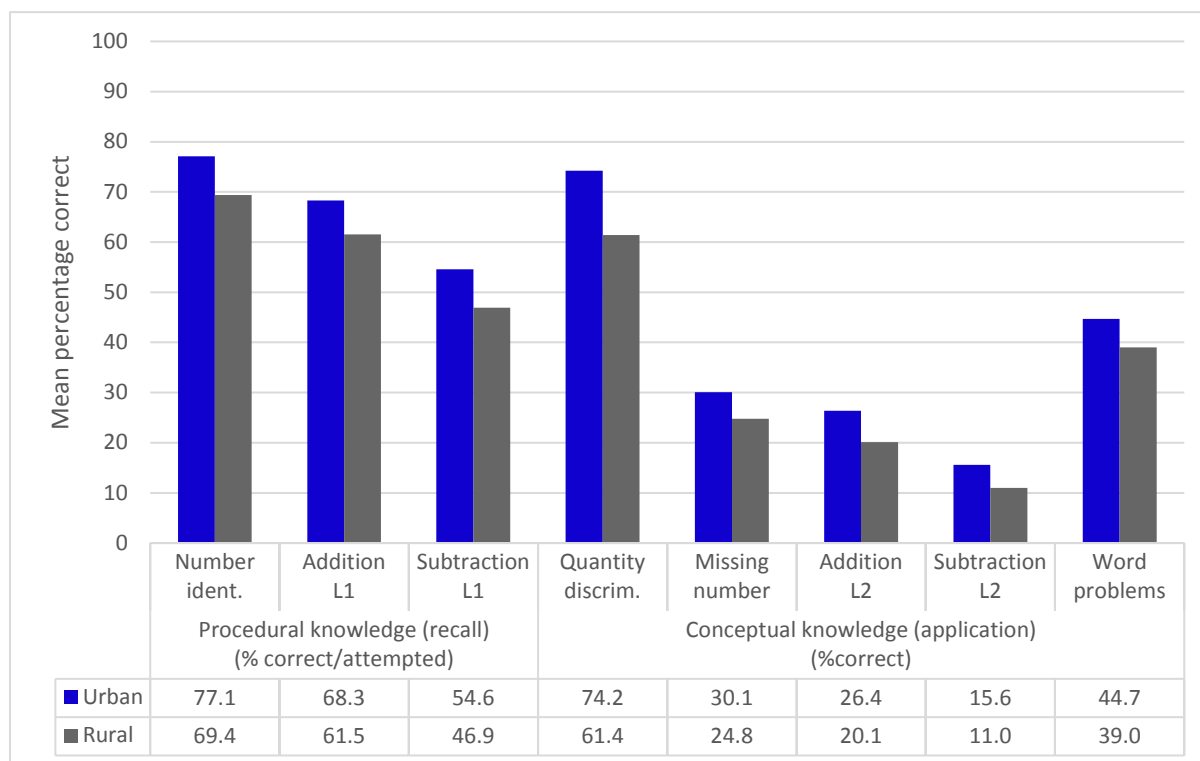
EGMA Geographic Variations

Urban/Rural

The overall results for the urban and rural pupils are summarised in *Figure 8*. Across the subtasks, the pupils in the urban schools performed better than the pupils in the rural schools

did. Most of these differences were statistically significant.²² The EGMA data showed only that the pupils in urban schools performed better than the pupils in the rural schools did. Further analysis will be needed to explain *why* there was a difference, although it is possible to speculate that much had to do with the difference in resourcing of these schools, in terms of both the qualifications of the teachers and the general infrastructure.

Figure 8: Performance on EGMA subtasks, by urban/rural classification of schools



Regions

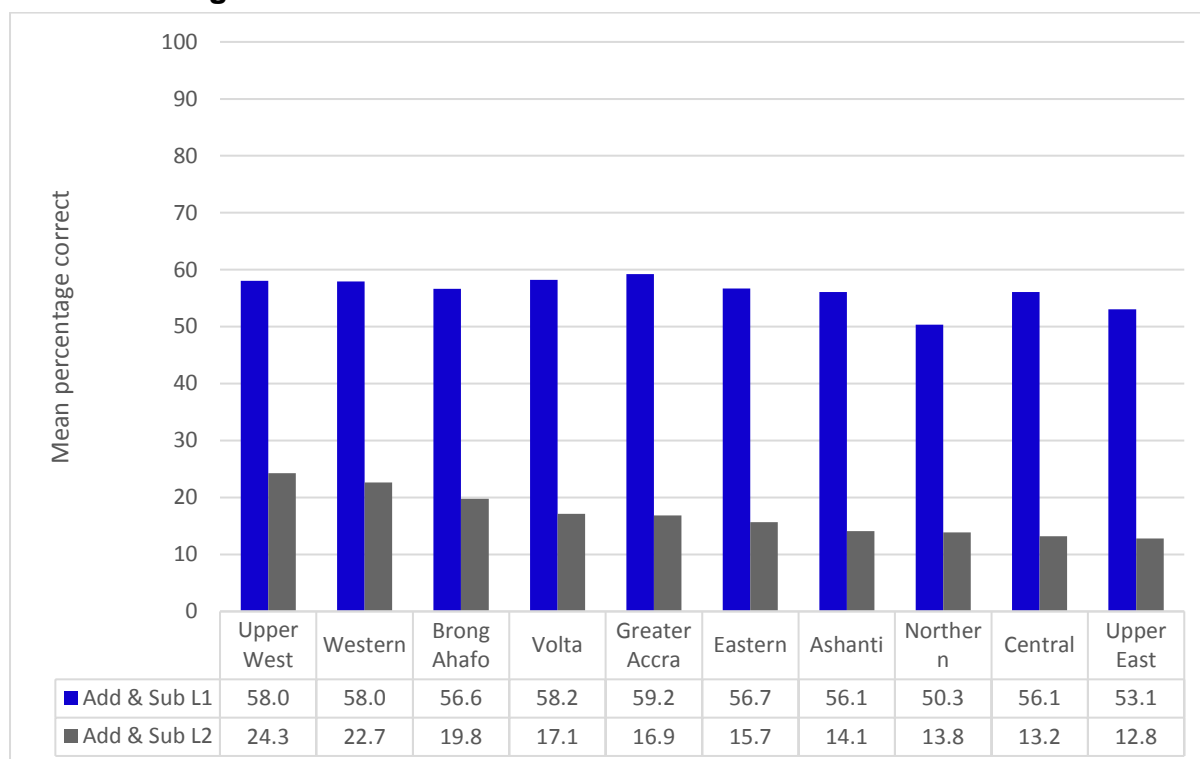
The overall results for the different regions showed no strong overall pattern. That is, no one region’s pupils performed best on all of the subtasks and no one region’s pupils performed worst on all of the subtasks. Furthermore, the general trend of pupils performing better on the more procedural subtasks than on the more conceptual subtasks is observable across the regions.

Figure 9 illustrates the performance by region on the addition and subtraction level 1 subtasks combined and the addition and subtraction level 2 subtasks combined. The regions have been arranged from the Upper West region, whose pupils performed best on the addition and subtraction level 2 subtasks combined (24.3%); to the Upper East region, whose pupils performed worst on the addition and subtraction level 2 subtask (12.8%). While the average performance on the addition and subtraction level 1 subtasks varied by less than 10% across the regions, the performance by the pupils in the Upper West region was nearly double that of

²² In statistics, a result—in this case, the difference in performance between the urban and rural pupils—is considered ‘statistically significant’ if it is unlikely to have occurred as the result of chance alone. That is, the difference in performance is not the result of the natural variation that arises through sampling, but rather the result of some structural difference in the attributes of experiences of the two groups.

the pupils in the Upper East region on the level 2 items. Since the level 1 skills are necessary but not sufficient, and the level 2 skills are more predictive of future success in mathematics, there may be some value in investigating further to understand why the pupils in Upper West performed better on the level 2 items than the pupils in Upper East did. That said, even the pupils in Upper West did not perform nearly well enough on the level 2 items to match the curricular expectations.

Figure 9: Performance on EGMA addition and subtraction subtasks, by region



Languages of Instruction

The results for the different languages of instruction, as with the regions, did not show a strong overall pattern. That is, there was no one language of instruction for which the pupils performed best on all of the subtasks and no one language of instruction for which the pupils performed worst on all of the subtasks. Again, the general trend of pupils performing better on the procedural subtasks than they did on the conceptual subtasks is observable across the languages of instruction.

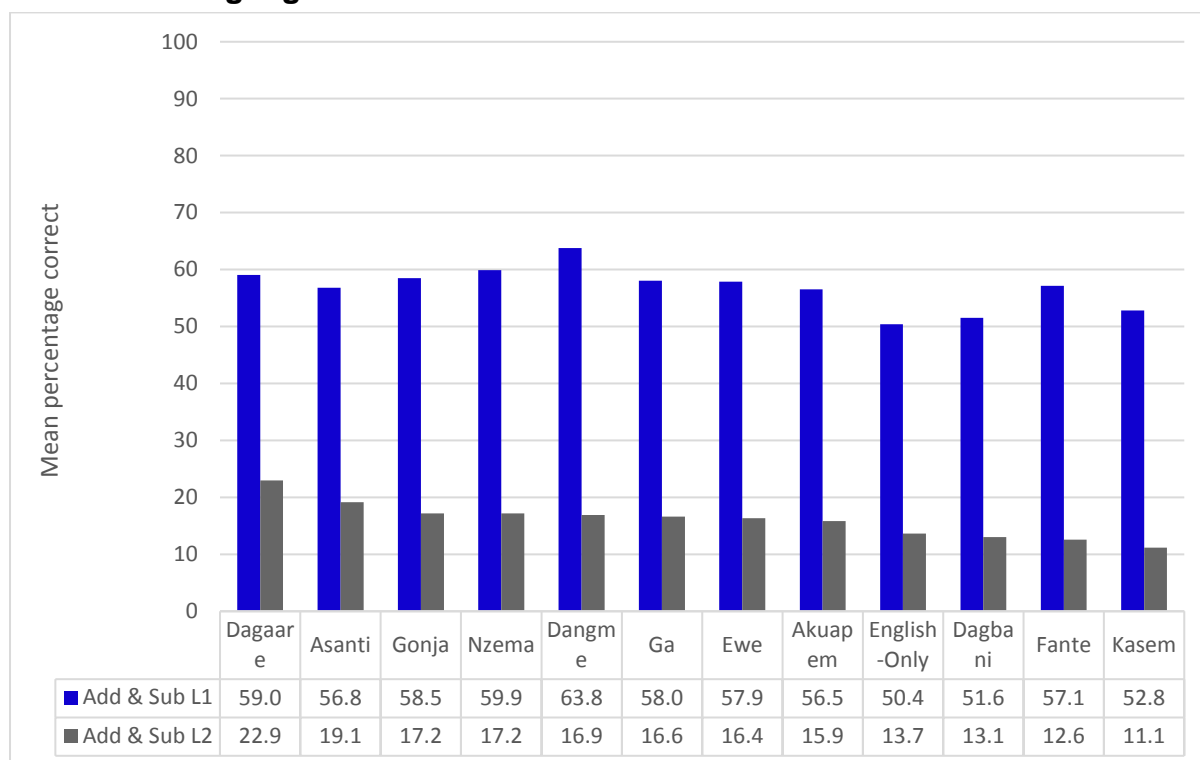
Figure 10 illustrates the performance by language of instruction on the addition and subtraction level 1 subtasks combined, and the addition and subtraction level 2 subtasks combined. The languages of instruction have been arranged from Dagaare, which corresponded to the best performance on the addition and subtraction level 2 subtasks combined (22.9%); to Kasem, which corresponded to the worst performance on the addition and subtraction level 2 subtasks (11.1%). While the average performance on the addition and subtraction level 1 subtasks varied by a little more than 10% across the languages of instruction, the performance on the level 2 items by the pupils receiving instruction in Dagaare was more than double that of the pupils receiving instruction in Kasem. Despite the

fact that the performance on the level 2 items by the pupils receiving instruction in Dagaare was better than for any other language, it was still very weak. Some further investigation into why the pupils receiving instruction in Dagaare performed better than the pupils receiving instruction in Kasem is warranted.

Notwithstanding the observations already made, recall that pupils were asked the EGMA questions in either the language of instruction of their school, or in English, or in a combination of the two; and they were allowed to answer the EGMA items in any language that they wanted to. The language(s) used by the pupils to answer the EGMA questions was recorded. Despite careful analysis, there were no strong differences in performance between pupils who responded only in the language of instruction of their school, only in English, or in a combination of languages. Furthermore, it does not seem as if the official language of instruction of the school and/or the extent to which pupils claimed to receive instruction in the official language of instruction (or not) were strong predictors of performance in mathematics.

In summary, the differences (if any) in performance according to language of instruction evident in Figure 10 may have as much to do with geographic distribution (urban/rural, regional, etc.) as with the quality level of instruction in the language.

Figure 10: Performance on EGMA addition and subtraction subtasks, by language of instruction



EGMA Results by Subtask

Number Identification

Number identification is to mathematics what letter recognition is to reading. If pupils cannot identify numbers, they cannot engage effectively in all aspects of mathematics.

The number identification subtask assessed the most procedural of mathematical skills and was the least demanding of the Ghana EGMA subtasks.

2	9	0	12	30
22	45	39	23	48
91	33	74	87	65
108	245	587	731	989

With the exception of item 11 (the number 91), which was correctly identified by only 70% of the pupils, more than 80% of the pupils could identify each of the one- and two-digit numbers. This is perfectly acceptable for primary 2. There was, however a sharp drop-off in performance as the items changed from one- and two-digit numbers to three-digit numbers, with just over 20% of the pupils being able to identify each of the numbers (245; 587; 731; and 989). Interestingly, only 14% of the pupils could identify the number 108 correctly.

The difference in performance on the one- and two-digit number items and the three-digit number items can in all likelihood be explained in terms of curricular expectations and experience with these numbers.

Addition and Subtraction (Level 1)

The addition and subtraction level 1 items were assessed in two different subtasks: one that consisted of addition items and the other of subtraction items. The level 1 addition and subtraction subtasks each consisted of items for which it was expected that pupils should develop some level of automaticity/fluency. The items on these subtasks represented the foundational addition and subtraction ‘facts’ that are at the heart of addition and subtraction with larger numbers. Without achieving some level of automaticity/fluency on the range of addition and subtraction ‘facts’ represented by these items, there is little expectation that pupils will be able to perform addition and subtraction (let alone multiplication and division) with larger numbers. That said, success in answering these questions, while necessary, is not sufficient to ensure success on the level 2 items, as already noted in the results for Ghanaian primary pupils.

$1 + 3 = \square$	$4 - 1 = \square$
$3 + 2 = \square$	$5 - 2 = \square$
$6 + 2 = \square$	$8 - 2 = \square$
$7 + 3 = \square$	$10 - 3 = \square$
$8 + 6 = \square$	$14 - 6 = \square$

Although the performance on the subtraction items was not as good as it was on the addition items, pupil performance on the items in these two subtasks was in line with the changing structure of the items.

Figure 11 illustrates the performance on the addition level 1 items, and the following trends are evident:

- The pupils performed best (between 58% and 86% of the pupils responded correctly) on the items involving the addition of a single-digit number to a single-digit number with a sum less than 10, i.e., not bridging the 10.
- Between 60% and 80% of the pupils responded correctly to the items involving the addition of two single-digit numbers with a sum equal to 10, i.e., ‘completing the 10’.
- Between 46% and 56% of the pupils responded correctly to the items involving the addition of a single-digit number to 10, i.e., ‘adding to 10’.
- Between 36% and 50% of the pupils responded correctly to the items involving the addition of a single-digit number to a two-digit number with a sum less than 20.
- The pupils performed least well (between 34% and 36% of the pupils responded correctly) on the items involving the addition of two single-digit numbers with a sum greater than 10, i.e., ‘single-digit addition involving bridging the 10’.

Figure 11: Item-level performance on the addition level 1 subtask

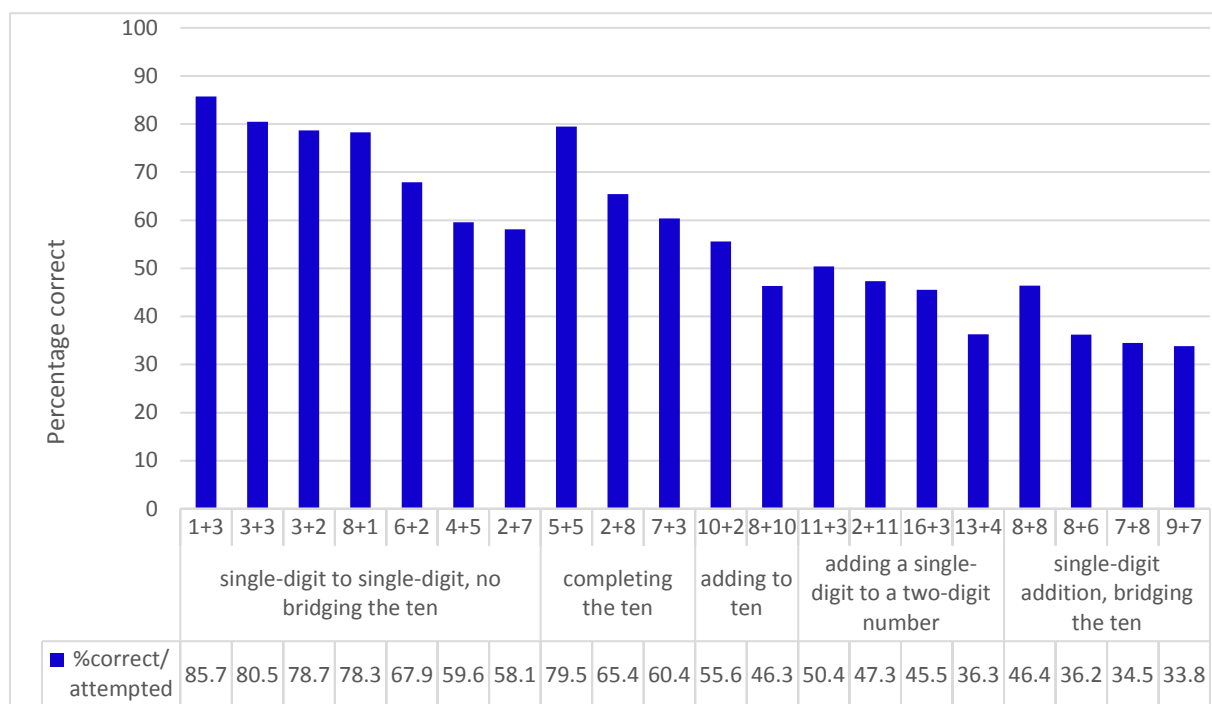
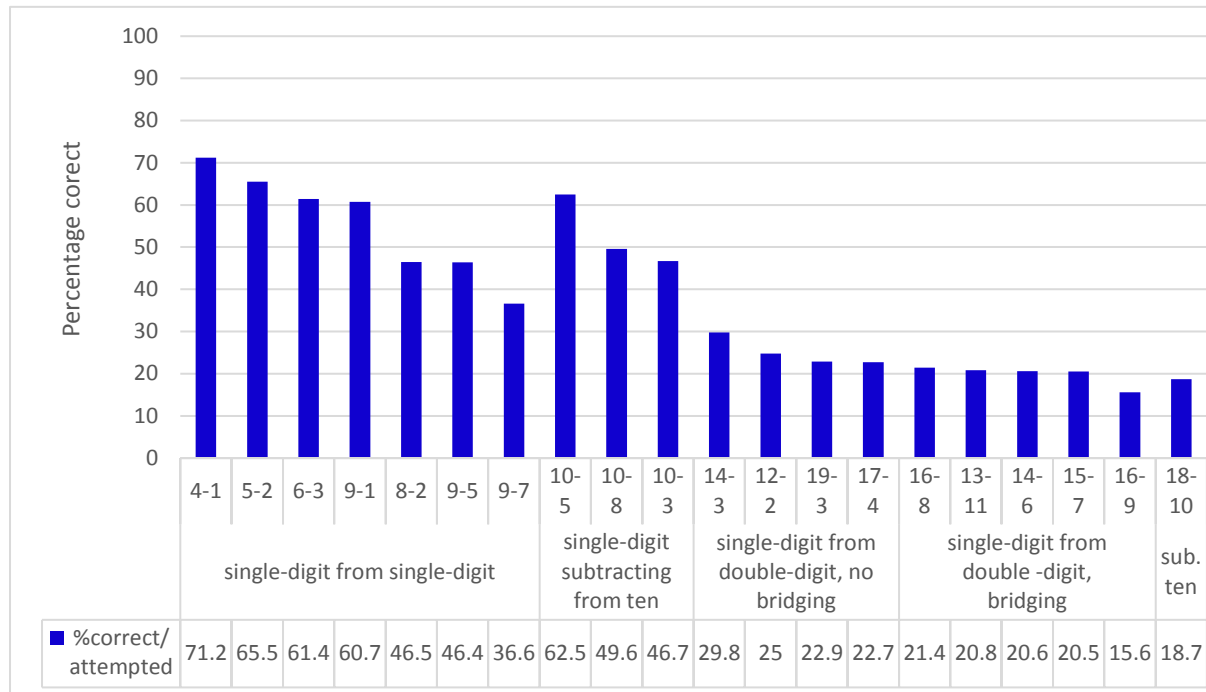


Figure 12 illustrates the performance on the subtraction level 1 items, and the following trends are evident:

- The pupils performed best (between 37% and 71% of the pupils responded correctly) on the items involving the subtraction of a single-digit numbers from a single-digit number.
- Between 47% and 63% of the pupils responded correctly to the items involving the subtraction of a single-digit number from 10, i.e., ‘subtracting from 10’.

- Between 23% and 30% of the pupils responded correctly to the items involving the subtraction of a single-digit number from a two-digit number (less than 20) that did not involve the bridging of the 10.
- The pupils performed worst (between 16% and 21% of the pupils responded correctly) on the items involving the subtraction of a single-digit from a two-digit number (less than 20) with a solution less than 20, i.e., ‘subtraction involving bridging the 10’.

Figure 12: Item-level performance on the subtraction level 1 subtask



In Ghana, it is expected that pupils should not only be able to respond correctly to a large percentage of these items, but also be able to do so with automaticity/fluency. Ghanaian primary 2 pupils responded to the addition level 1 items with a fluency of 8.9 correct answers per minute and to the subtraction level 1 items with a fluency of 6.1 correct items per minute. This is reasonably acceptable for primary 2. What is of concern, however, is the striking difference between the addition and subtraction fluency scores. The scores suggest that more attention/time in class is being devoted to addition, with less to subtraction; and in all likelihood, very little time is being devoted to developing an awareness of the interrelatedness of addition and subtraction: since $3 + 2 = 5$, it follows that $5 - 2 = 3$ and $5 - 3 = 2$. If children are exposed to and learn about number relationships and operations with numbers in an interrelated way, there is less for them to memorise and the knowledge they develop is more easily applied with understanding in broader mathematical contexts—such as in the EGMA addition level 2 and subtraction level 2 subtasks.

Quantity Discrimination

The quantity discrimination subtask in the EGMA in Ghana measured pupils’ ability to make judgments about differences by comparing quantities, represented by numbers. The subtask

measured the pupils' sense of magnitude—Did they have a sense of how big a number/quantity was, and could they compare two numbers/quantities? Being able to compare numbers/quantities is a foundational mathematical skill that is critical to effective and efficient problem-solving strategies. For example, being able to compare numbers/quantities is important when estimating the reasonableness of answers to problems. In the early school years, this means developing an awareness that addition results in a larger number, subtraction produces an answer that is smaller than at least one of the original numbers, multiplication can result in answers that are larger than the addition of the same numbers, and so on.

5	7	94	78
11	24	146	153
39	23	287	534
58	49	623	632
65	67	867	965

Before responding to the items on this subtask, pupils completed two practise items to ensure that they understood the instructions of the assessor.

A distinct pattern emerged in the pupils' responses. More than 84% of the pupils could correctly discriminate between the quantities represented by the pairs in the first three items—pairs of quantities (numbers) less than 40. Between 71% and 76% of pupils could correctly discriminate between quantities represented by numbers in the range from 50 to 99, and less than 43% of pupils could discriminate between quantities represented by three-digit numbers. In all likelihood, the difference in performance on items involving two-digit numbers and items involving three-digit numbers was a function of the different amount of time spent working on the different number ranges in class.

Missing Number

Mathematics is the study of patterns.

Determining missing numbers is an important mathematical skill that involves pattern recognition and extension. Being able to recognise number patterns—including counting patterns (by ones, tens, hundreds, fives and twos, etc., both forwards and backwards)—lays the foundation for other mathematical concepts, including multiplication and division and, later, algebra. Being able to identify patterns more generally aids pupils in problem solving.

Before responding to the items on this subtask, pupils completed two practise items to ensure that they understood the instructions of the assessor.

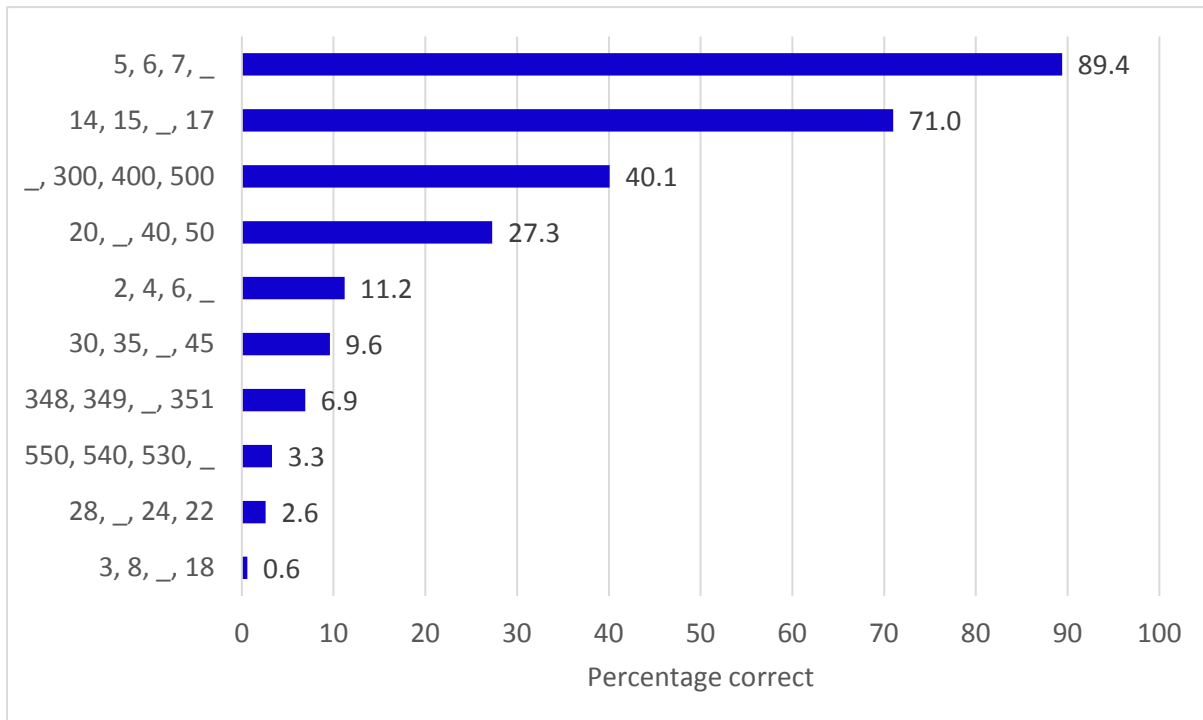
5	6	7	
14	15		17
20		40	50
	300	400	500

Figure 13 illustrates the performance on the subtraction level 1 items, and the following trends are evident:

- Pupils performed best (between 71% and 90% of the pupils responded correctly) on the items with a step size of 1 and numbers below 20: 5, 6, 7, **8**, and 14, 15, **16**, 17.

- 40% of the pupils were able to correctly determine the missing number in the number pattern 200, 300, 400, 500, which has multiples of 100 and a step-size of one hundred. Determining the missing number in this pattern involves recognising the relationship between the patterns 2, 3, 4, 5 and 200, 300, 400, 500.

Figure 13: Item-level performance on the subtraction missing number subtask



- Less than 30% of the pupils were able to correctly determine the missing number in the pattern 20, 30, 40, 50, which involves multiples of 10 and a step-size of 10. While on the one hand we might expect pupils to do better on this item than they would on the item involving the multiples of 100, because the numbers in the pattern with multiples of 100 are larger, it should be remembered that the vocabulary creates confusion (especially so in English, a response language used by many of the pupils). While ‘two-hundred, three-hundred, four-hundred, five-hundred’ sounds a lot like ‘two, three, four, five’, ‘twenty, thirty, forty, fifty’ sounds quite different and primary 2 children were less likely to see the link between the 2, 3, 4, 5 pattern and the 20, 30, 40, 50 pattern.
- On the remaining items, which involved step-sizes of two and five as well as larger numbers, between 11% and 1% of pupils could determine the missing numbers correctly.

The performance on this subtask indicates a trend of pupils responding correctly only to the most procedural (memorise-able) items and struggling on the items that required understanding and applying foundational mathematical skills.

Addition and Subtraction (Level 2)

The addition level 2 and subtraction level 2 subtasks assessed pupils' conceptual understanding of addition and subtraction as well as their ability to apply the procedural knowledge assessed in the corresponding level 1 subtasks to more complex tasks. Pupils were allowed to use paper and pencil in order to help them solve these problems if they wanted to—they did not have to use these resources. Pupils who did not solve a single problem correctly on the level 1 items (i.e., 8.1% of the pupils in the case of addition level 1 and 19.3% in the case of subtraction level 1) were not asked to solve the level 2 problems.

More than one half (50.6%) of the pupils who attempted the addition level 2 and 69.9% of the pupils who attempted subtraction level 2 were unable to answer a single item correctly. This is in stark contrast to the rather more impressive performance on the addition level 1 and subtraction level 1 subtasks.

A close examination of the items on the addition level 2 subtask shows an increasing complexity/conceptual demand:

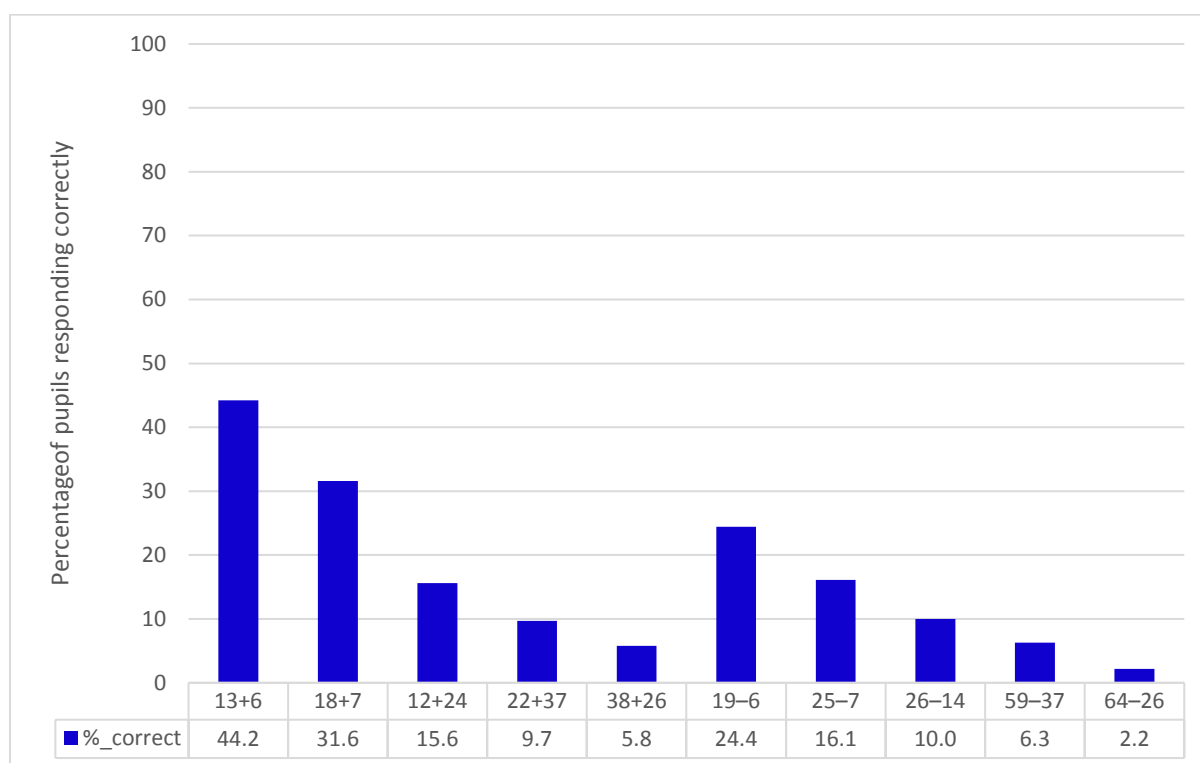
Addition and subtraction level 2 items	
$13 + 6 = \square$	$19 - 6 = \square$
$18 + 7 = \square$	$25 - 7 = \square$
$12 + 24 = \square$	$26 - 14 = \square$
$22 + 37 = \square$	$59 - 37 = \square$
$38 + 26 = \square$	$64 - 26 = \square$

- From the addition of a single-digit number to a two-digit number with a sum less than 20;
- To the addition of a single-digit number to a two-digit number involving bridging and a sum greater than 20;
- To the addition of two two-digit numbers not involving bridging but involving increasingly larger number ranges;
- To, finally, the addition of two two-digit numbers involving bridging.

The subtraction level 2 subtask had the same pattern of increasing complexity/conceptual demand as the addition level 2 subtask.

Figure 14 illustrates the performance by item for each of the items in these subtasks. A striking relationship emerged between the performance of the pupils and the conceptual demand of the items. There was also a marked difference between the performance on the addition level 2 subtask and on the subtraction level 2 subtask—with the performance on the subtraction level 2 subtask being much poorer.

Figure 14: Item-level performance on the addition level 2 and subtraction level 2 subtasks



What is so notable about the addition level 2 and subtraction level 2 performance is not that the response pattern of the pupils was aligned to the conceptual demand of the items, but rather that it was so out of alignment with the expectation created by the performance on the addition level 1 and subtraction level 1 subtasks. While the performance on the addition level 1 and particularly subtraction level 1 subtasks could and should be better, it is in fairness much better than the performance by primary 2 pupils in some other African countries where the EGMA has been administered.²³ In other words, with the pupils having fared relatively well on the addition level 1 and subtraction level 1 subtasks, we might have expected better performance than was observed on the addition level 2 and subtraction level 2 subtasks. As already suggested, this disconnect hints very strongly at the way in which pupils learn mathematics. These Ghanaian pupils were unable to apply their basic addition knowledge/facts to solve one- and two-digit addition problems. In all likelihood, they knew the basic addition knowledge/facts as memorised facts as opposed to doing so with understanding and without being able to apply this knowledge.

Word Problems

Problem solving is central to doing mathematics. Because the focus of this EGMA subtask in Ghana was on assessing the pupils' ability to make a plan and solve a problem, the numerical values involved in the problem were deliberately small (single-digit arithmetic) so as to allow

²³ For example, see: (1) USAID Nigeria Northern Education Initiative. (2013). *Results of the Early Grade Reading and Early Grade Mathematics Assessments (EGRA & EGMA) in Bauchi and Sokoto States* (three documents). <https://www.eddataglobal.org/countries/index.cfm?fuseaction=pubDetail&ID=514>. (2) Piper, B., & Mugenda, A., (2013). *The Primary Math and Reading (PRIMR) Initiative: Midterm impact evaluation*. Report prepared for USAID under the EdData II project, Task Order No. ID-623-M-11-00001. Research Triangle Park, North Carolina, USA: RTI International. <https://www.eddataglobal.org/countries/index.cfm?fuseaction=pubDetail&ID=486>.

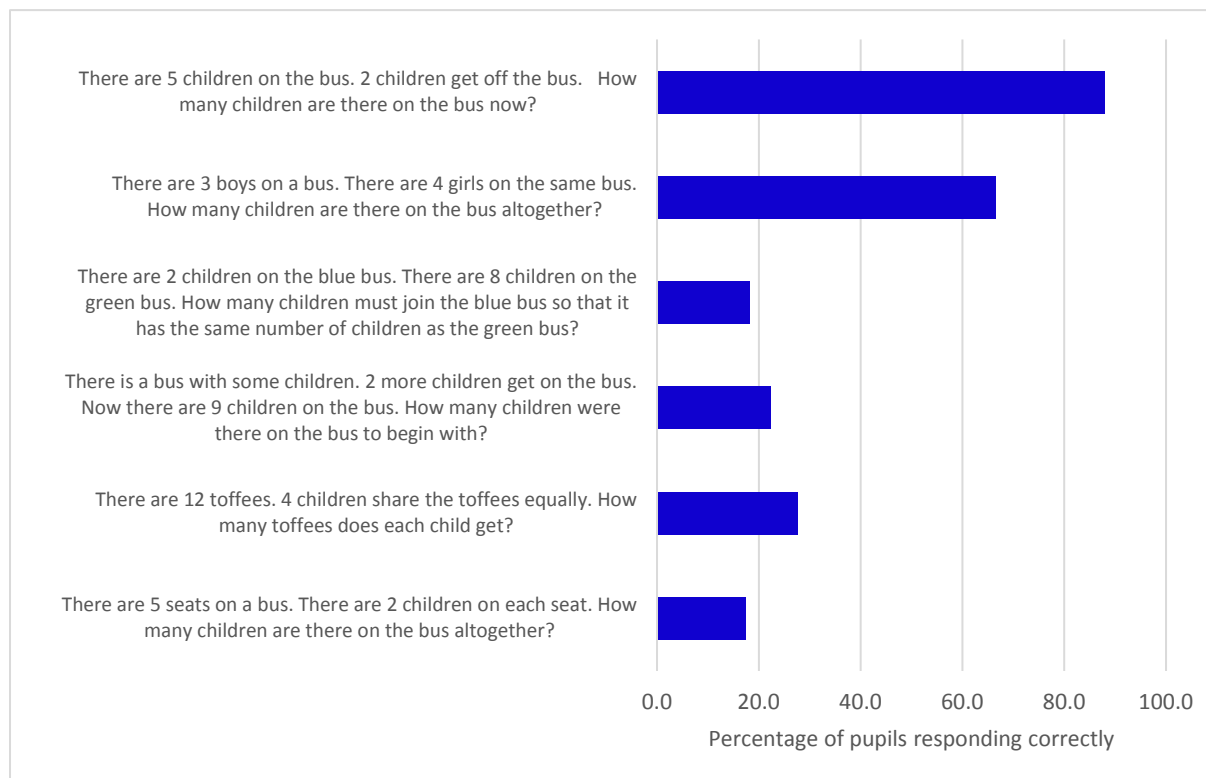
for the targeted skills to be assessed without confounding problems with calculation skills that might otherwise impede performance. Pupils were allowed to use paper and pencil, and counters (objects) if they wished, in order to help them solve/model these problems— although they did not have to use these resources.

Before responding to the items on this subtask, pupils did two practise items to ensure that they understood the instructions of the assessor. The word problems were administered in either the language of instruction, or in English, or in both according to the needs of the pupils.

The word problems (see *Figure 15*) were deliberately designed to provoke the pupils into making different plans:

- Problem 1 has a ‘change – result unknown’ structure and was designed to provoke a subtraction or counting back type strategy.
- Problem 2 has a ‘combine – total unknown’ structure and was designed to provoke an addition or counting on type strategy.
- Problem 3 has a ‘compare – part unknown’ structure and was designed to provoke either an addition/counting-on or subtraction/counting-back type strategy.
- Problem 4 has a ‘change – start unknown’ structure and was designed to provoke an addition or counting on type strategy. Problem 4 was conceptually more demanding than Problem 1 because the starting value was unknown and needed to be determined.

Figure 15: Item-level performance on the word problems subtask (English version)



- Problem 5 has a ‘sharing’ structure. Sharing is a familiar activity in the lives of children, and many children can model and solve this problem using counters long before they start school.
- Problem 6 has a ‘multiplication (grid/array)’ structure. While a typically a little harder than Problem 5, many children are nonetheless able to model and solve this type of problem using counters before they start school.

Table 9 above showed that the primary 2 pupils scored, on average, 40% for the word problems subtask. This was markedly better than the performance on the other conceptual subtasks: missing number (26.2%), addition level 2 (21.4%) and subtraction level 2 (11.8%). At first look, this seems encouraging, as it may suggest that these Ghanaian pupils, while struggling to apply their basic/foundational mathematical knowledge/skills in more conceptual context, were nonetheless able to solve problems when these were posed in more familiar (everyday) contexts. A detailed analysis of the item-level responses, however, paints a slightly different picture.

In general, the pupils performed very well on the first two problems (88.0% of the pupils correctly answered Problem 1 and 66.5% of the pupils correctly answered Problem 2). By contrast, the performance on the other problems was much weaker, with only Problem 5 (the sharing problem) eliciting a correct response from more than one quarter (27.6%) of the pupils. The difference between the first two problems and the other problems is that the first two problems are posed in a way that is more typical of how teachers tend to ask word problems, whereas the other problems are less typical of classroom-type word problems. In other words, in the contexts in which children experienced the problems as situations to be understood, analysed and solved, the response patterns across the problem types was more even. The starkly different response patterns between Problems 1 and 2 and the rest of the problems suggests the possibility that the solution of word problems in Ghanaian classrooms has been reduced to a method, formula or recipe, rather than the making of a plan to solve a problem.

V. Conclusions

The results of the EGRA in Ghana showed that most of these pupils were not learning to read in any language. By the end of P2, performance should be better than it was on this assessment. The pupils lacked the foundation of pre-reading and early reading skills on which to build fluency and comprehension. The very few who had learned to read with comprehension also knew the sounds of letters and how to decode and read words; had access to books; and practised reading at home and at school. The majority of pupils, however, did not know the sounds of letters and how to decode and read words; did not have access to books; and said they did not practise reading at home and at school.

The results of the EGMA study in Ghana strongly suggest that the teaching of mathematics focuses on memorisation of facts, rules and formulas. Based on the EGMA results, this approach does not appear to be working. While it may contribute to the impression that children ‘know their mathematics’ in the very early grades (e.g., P1), the EGMA in Ghana

has shown that pupils are unable to apply their memorised knowledge and hence they are not well prepared to learn more complex and important mathematics in the higher grades.

Unless pupils gain these reading and mathematics skills and practise them more, they will fall further behind and continue to struggle in school.

VI. Recommendations

The NEA 2013 research team, including NEAU representatives, presented draft recommendations at a dissemination workshop—the National Policy Forum—in Ghana in February 2014 for the Ministry of Education and other stakeholders. Feedback from these reviewers, as well as input from the earlier District Cluster Forums managed by the NEAU, was incorporated into the draft recommendations and used to create this section of the final version of the EGRA/EGMA Findings Report. The recommendations centred on instructional methods, teacher training and support, availability of teaching and learning materials, and parent and community involvement.

Reading Instructional Methods: How Pupils Learn vs. What Pupils Learn

Study results:

The EGRA study showed that when children have a grasp of some of the basic ‘building blocks’ in learning to read, such as understanding of letter sounds and the ability to decode or ‘sound out’ new words, they are more likely to be able to read fluently (e.g., quickly) and to understand what they read. Few pupils demonstrated these basic skills on the EGRA, in any of the languages assessed; and therefore it should not be surprising that few children in the EGRA study (on average, less than 2%) were able to read a passage fluently and with comprehension.

Recommendations:

Instructional methods for teaching reading need to shift from the conventional ‘chalk and talk’ methods to classroom instructional practices that focus on the critical components of successful literacy acquisition, so that students learn to read in the early grades. When teachers develop their students’ oral language skills (e.g., phonological awareness and vocabulary) and teach the relationship between letters and sounds in a systematic and explicit fashion, their students have the foundation for success in recognising words and reading with comprehension. Ghanaian teachers need to be trained in these teaching methods through both in-service and pre-service programmes.

Reinvigorating the National Literacy Acceleration Programme (NALAP)²⁴ would be an important first step toward reaching this goal. Within the NALAP curriculum is a clearly stated timetable for literacy instruction. A reasonable literacy timetable should be established as policy. The timetable should incorporate shared and independent reading as appropriate, to ensure that students have time to practice their new skills.

²⁴ As summarised in the 2013 EGRA/EGMA analysis report, “NALAP provides for instruction in the predominant Ghanaian language of the local community through grade 3, with English introduced gradually in the early grades, and pupils making the full transition in grade 4. By grade 4 the programme assumes pupils will have first become fluent speakers and readers of the Ghanaian language of instruction, followed by English” (p. 2).

Mathematics Instructional Methods: How Pupils Learn vs. What Pupils Learn

Study results:

On the EGMA study, students did reasonably well on the most procedural of items, such as the basic addition and subtraction facts. However, on the more conceptual items, there was a sharp drop-off in performance, with nearly 70% of the pupils 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 more procedural and more 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 you have to know (remember) the answer rather than having a strategy for developing it; or as the memorisation of facts, rules and procedures rather than as a meaningful, sense-making, problem-solving activity.

Recommendations:

Either through their own resources or with the assistance of technical experts, the Ministry of Education and the GES need to identify effective, evidence-based practices regarding the teaching of early grade mathematics. Such an approach would support the acquisition of foundational mathematics *and* reading skills, with an emphasis on students' conceptual understanding.

Once the Ministry and the GES have established an evidence-based approach to teaching early grade mathematics for Ghana, attention should shift to implementing the approach.

The implementation should be achieved through both in-service and pre-service teacher training programmes. Teachers need to receive specific training on how to teach mathematics in the early grades. In addition, suitable learning materials need to be developed.

Teacher Development and Management

Study results:

International research on learning shows that students who attend classrooms where teachers are qualified, engaged with their pupils, and well supervised are more likely to do well in school. In many countries, schools in remote regions and early grade classrooms tend to have fewer qualified teachers than in urban areas and in upper primary classrooms. In this case, the study findings demonstrated that students in urban settings consistently outperformed students in rural settings, especially in the three regions of northern Ghana.

Teachers and teaching practice, teacher management, supervision and support, and teacher placement and incentives were the subjects of much discussion at the National Policy Forum. The importance of addressing these issues was the most prominent of the recommendations emerging from the policy dialogue.

Recommendations:

Districts need to establish systems for regular school, teacher and student performance monitoring, tied to clear performance targets. Data from such district monitoring systems should be used to inform school- and district-wide interventions for improving student learning outcomes.

District and school management should work together to ensure that sufficient supervision or coaching is available to assist teachers as they learn and apply new and effective teaching methods. To this end, training on effective coaching for circuit supervisors and head teachers is needed. Budget allocations to support regular school coaching visits by district circuit supervisors must be provided for.

Policy related to placement and distribution of teachers in primary schools should be reviewed and improved upon to better support early grade literacy and numeracy attainment. Qualified teachers are needed in the lower primary grades and in rural areas. Furthermore, whenever and wherever possible, teachers placed in the lower primary classrooms should be fluent and literate in the language of learning and instruction of their placement school. To support this, it is recommended that Ghanaian language pedagogy (e.g., teaching reading and mathematics in the local language and bridging to English in the mid-primary grades per Ghanaian language policy) be considered as a required, examinable course in the Colleges of Education.

Time to Practice and the Availability of Materials

Study results:

The EGRA and EGMA studies showed that the majority of pupils had an exercise book, but less than half of the children had an English or mathematics textbook. Fewer pupils (only approximately 35%) had a supplemental reader, and only 20% of the pupils reported that they were able to take materials home for practice. Study findings showed that the few children who were able to read with comprehension had access to materials and also practiced reading at school and at home.

Recommendations:

Unless pupils gain the basic reading and mathematics skills in the early grades and are given ample opportunity to practice, they will fall farther and farther behind in school in the later years. Reading and mathematics textbooks and supplemental materials that children can take home to practice are important for children's learning.

The GES, District and Regional Education Officers, the District Assembly, and head teachers should work together to ensure that all students have textbooks in school and are allowed to take texts home.

The GES, District and Regional Officers, the District Assembly and District Education Oversight Committee, School Committees, parent-teacher associations, community members, religious organisations, language bureaus, nongovernmental organisations, and the private sector should come together to contribute to building a strong base of supplementary readers for students to use at school and at home for independent reading and practice—in local languages and in English. Establishing 'classroom book boxes' and reinvigorating the community library are examples of what could be done.

Parental Involvement

Study results:

The study findings showed that pupils who had higher learning outcomes on the national assessments were more likely to: attend school regularly; have books to take home and use for practice; have homework assignments that are graded by teachers; and have someone at home who helps them with their homework (e.g., someone to read to or do mathematics problems with).

Recommendations:

As part of the GES/NEAU nationwide dissemination programme from November 2013 to January 2014, District Advocacy Teams (DATs) were established to champion advocacy for children's learning, in districts and communities. Support from the Regional and District Education Offices and the District Assemblies to keep these DAT teams active is recommended.

Parents and communities should work closely with teachers and schools to develop and implement programmes to support children's learning at home and in the community. A few ideas from participants included: (1) Organise community-level parent advocacy groups focusing specifically on supporting early grade learning in reading and mathematics; (2) encourage regular school attendance by all children; (3) organise storytelling, shared reading, and after-school programmes; and (4) strongly encourage parents to visit schools often, meet with teachers and discuss how they can help their child at home.

Annex A: 2013 Ghana EGRA Analyses by Language

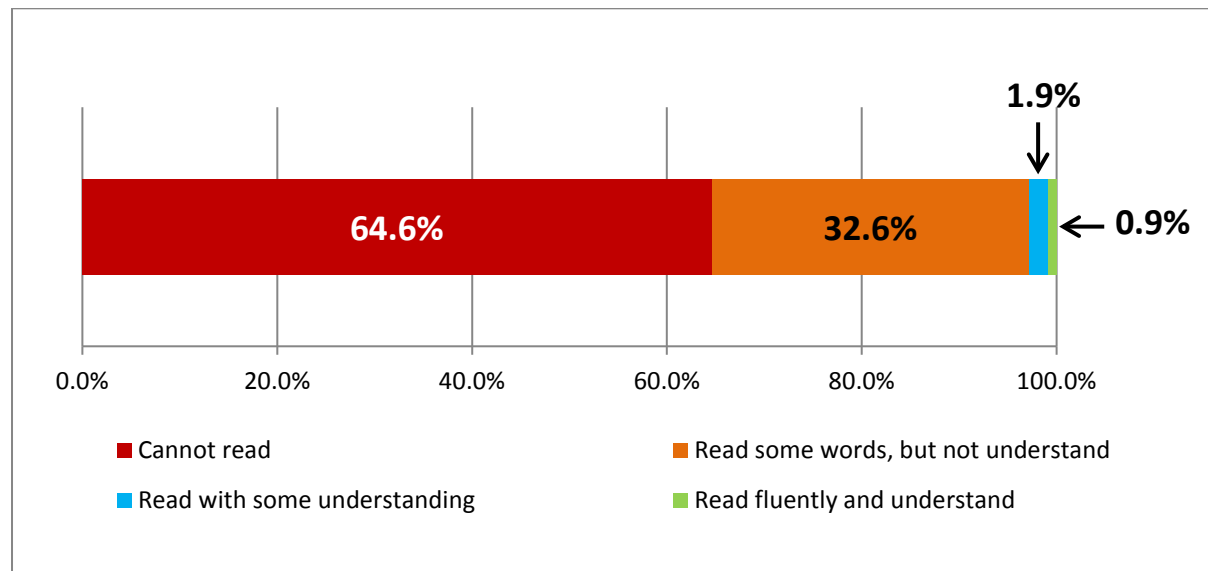
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How Well Are Children Reading in Akuapem Twi?

Overview of Results

The EGRA was administered to 689 pupils in schools where Akuapem Twi was the designated language of instruction. Based on the results of the oral passage reading and reading comprehension subtasks, the state of reading in Akuapem Twi can be summarised as shown in *Figure 1*:

Figure 1: Distribution of pupils by performance level,²⁵ Akuapem Twi



- Most pupils (64.6%, $n = 478$) were unable to read a single word of the story.
- Many pupils (32.6%, $n = 191$) read fewer than 10 correct words per minute, indicating they were just beginning to understand the alphabetic principle (or the relationship between sounds and letters). Not surprisingly, these pupils answered only 5% of the passage questions correctly. These pupils could read some words, but were not yet at a point of being able to understand what they read.
- A small group of pupils (1.9%, $n = 16$) was transitioning from word-by-word identification to increased fluency. On average, these pupils read 44 correct words per minute and answered 57% of the passage questions correctly.
- An even smaller group (0.9%, $n = 4$) had sufficient fluency (automatic and accurate word identification) to focus on comprehension. On average, these pupils read 65 words per minute and answered 87% of the passage questions correctly.

²⁵ The four categories are defined as follows:

- **Cannot read:** oral reading fluency (ORF) score is zero
- **Read some words, but not understand:** ORF score is greater than zero and reading comprehension score is below 60% correct of those attempted
- **Read with some understanding:** reading comprehension score is 60% of those attempted
- **Read fluently and understand:** reading comprehension score is 80% correct of total

Results by Subtask

Table 1: Average EGRA scores in Akuapem Twi

EGRA subtask	Percentage of pupils who scored zero	Average % correct of items attempted	Average fluency score (all pupils)	Average % correct of items attempted (excluding pupils with zero scores)	Average fluency score (excluding pupils with zero scores)
Listening comprehension	23.8%	48.0%	—	63.0%	—
Letter sound knowledge	33.1%	39.2%	14.7 correct letter sounds per minute	58.6%	22.0 correct letter sounds per minute
Non-word decoding	76.4%	12.2%	3.2 correct non-words per minute	51.8%	13.7 correct non-words per minute
Oral passage reading	64.6%	14.5%	4.6 correct words per minute	40.9%	13.1 correct words per minute
Reading comprehension	89.7% ²⁶	5.1% ²⁷	—	49.0%	—

Listening Comprehension

This subtask measures an important pre-reading skill—the pupils’ ability to listen to and understand oral language. Pupils listened to a short story that was read to them in Akuapem Twi, and were then asked three questions about the story. Just less than a quarter (23.8%) of pupils scored zero (*Table 1*)—they were unable to answer a single question correctly. The overall average score for all pupils was 48.0%. The average score for the pupils who did not score zero on the subtask (i.e., 76.2% of the students) was 63.0%. The data suggest that most pupils were able to understand a story told to them in a familiar language.

Interestingly, but not surprisingly, the analysis showed that pupils who reported speaking a language at home other than Akuapem Twi were more than three times as likely²⁸ to score zero on the listening comprehension subtask as pupils who reported speaking Akuapem Twi at home.

The performance of the pupils on this subtask in Akuapem Twi was very different from their performance in English. After listening to a story in English being read to them, 74% of the pupils were unable to answer a single question about the story correctly. This is three times

²⁶ This figure includes pupils who were not asked any comprehension questions because they could not read the story passage.

²⁷ Of the total number of items in the reading comprehension subtask (five), the average percentage correct was 3.6%.

²⁸ Odds ratio = 3.21.

the number for Akuapem Twi. If these pupils were not regularly communicating in English, it is not surprising that they demonstrated greater oral language comprehension in Akuapem Twi.

Letter Sound Knowledge

The letter sound knowledge subtask assesses a pupil's ability to produce the sounds of the letters of the alphabet naturally, without hesitation. If children struggle to produce letter sounds, they are unlikely to be able to decode words and read fluently. One third (33.1%) of the pupils were unable to identify the sound of a single letter correctly. The average correct letter sound score was 39.2% out of items attempted at a fluency of 14.7 correct letter sounds per minute (clspm). When pupils scoring zero were removed from the analysis, the average correct letter sound score was 58.6% out of items attempted at a fluency of 22.0 clspm. The pupils who could produce the sound of at least one letter correctly took, on average, almost 3 seconds per letter to produce the sound. This finding suggests that letter sound production was not yet fluent for most of these pupils. Instead, they were having to spend time thinking about each letter. Since letter sound production is important for identifying words (i.e., decoding), and automatic decoding facilitates reading comprehension, their low scores on non-words, passage reading, and comprehension are understandable (**Figure 1**).

Item analysis showed that pupils experienced more difficulty with some letters compared to others. In Akuapem Twi, pupils had more difficulty with these letters (in both upper- and lower-case): **E, O, E, W, B, and Y**.

When these pupils were assessed with the English EGRA, 46.6% scored zero on the letter sounds subtask (not shown).

Non-word Decoding

For the non-word decoding subtask, pupils not only must know the sounds of individual letters, but also must be able to blend one sound with the next to correctly decode and say an unfamiliar word. Over three-quarters of pupils (76.4%) were unable to decode non-words in Akuapem Twi. This is not surprising given the performance on the letter sound knowledge subtask. The average score on the non-word decoding subtask was 12.2% correct out of items attempted at a fluency of 3.2 correct non-words per minute. When pupils scoring zero were removed from the analysis, the average score on the non-word decoding subtask was 51.8% correct out of items attempted at a fluency of 13.7 correct non-words per minute, indicating that pupils were just beginning to understand and apply the relationship between sounds and letters.

Performance on the non-word decoding subtask was strongly correlated with performance on the letter sound knowledge subtask, as well as with the oral passage reading subtask (discussed in the next section).²⁹

Slightly fewer of the pupils who completed the Akuapem Twi EGRA scored zero on the non-word decoding subtask of the English EGRA (72.8%; not shown).

²⁹ Pearson correlation = 0.602 and 0.842, respectively.

Oral Passage Reading

As is depicted in **Figure 1** above, the majority of pupils (64.6%) scored zero on the oral passage reading subtask. The average score was 14.5% correct out of items attempted at a fluency of 4.6 correct words per minute (cwpm). Like the non-word reading results, this indicates that these pupils were just learning to decode words. When the pupils scoring zero on this subtask were removed from the analysis, the average score was 40.9% correct out of items attempted at a fluency of 13.1 cwpm. This means that pupils who could read at least one word correctly took, on average, more than 4.5 seconds to read each word.

A small group of pupils (1.9%) scored at least 60% on the reading comprehension subtask of the questions they attempted to answer. The average oral reading fluency (ORF) score for these pupils was 44 cwpm. This suggests that pupils who were reading 40 cwpm or more were shifting from word-by-word identification to increased fluency.

Pupils classified in **Figure 1** as “reading with comprehension” (0.9% of the pupils) scored at least 80% overall on the reading comprehension subtask, meaning that they correctly answered 4 or all 5 of the comprehension questions. The average ORF score for these few pupils was 65 cwpm.

As is mentioned above, there was a strong relationship between pupil performance on this subtask and the non-word decoding subtask, meaning that pupils who performed well or poorly on one tended to perform similarly on the other.

On the English EGRA, 41.4% of these pupils scored zero on the oral passage reading subtask (not shown) compared with 64.4% for Akuapem Twi.

Reading Comprehension

As can be seen in **Table 1**, a large majority of pupils (89.7%) were unable to answer a single reading comprehension question correctly in Akuapem Twi. The average number of questions *attempted* was 1 (out of a total of 5), and the average score was 5.1% correct of questions attempted. When the pupils scoring zero on this subtask were removed from the analysis, the average score was 49% correct out of items attempted. This reflects the lack of fluency with which these pupils were reading. For this subtask, pupils were asked only the questions that corresponded to the amount of the text that they had read. In other words, few pupils were able to read far enough into the passage before the time limit was reached to be asked more than the first comprehension question. In the case of Akuapem Twi, this meant 9 or more words in one minute.

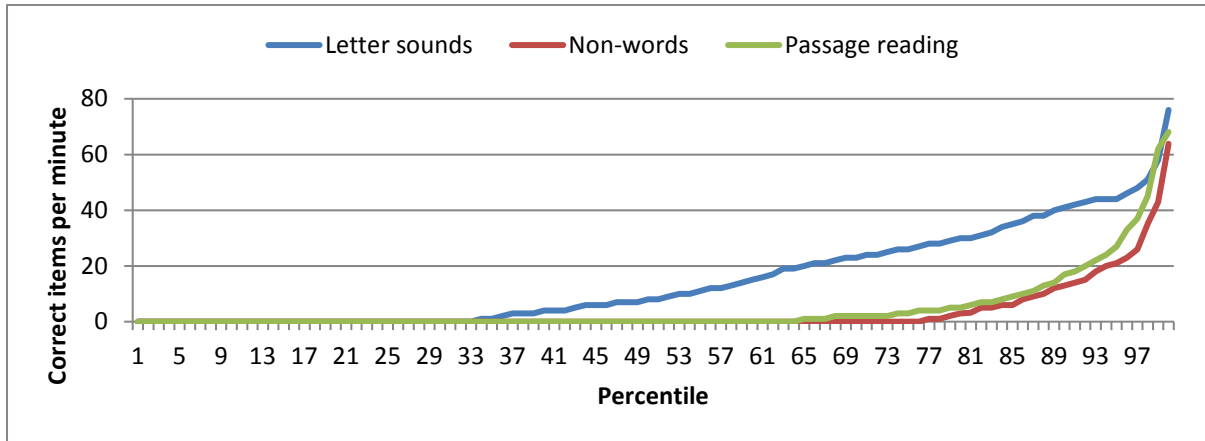
On the English EGRA, 88.9% of these pupils were not able to answer a single reading comprehension question correctly (not shown).

Correct Items per Minute, by Percentile

Finally, **Figure 2** presents the percentile distribution for the three timed subtasks of the Akuapem Twi EGRA. It shows the corresponding number of correct items per minute for each percentile, and illustrates the relationships among the skills measured by these three subtasks. For example, at about the 80th percentile, on average, pupils were achieving 30 correct letter sounds per minute, 5 correct words per minute on the passage reading subtask,

and 3 correct non-words per minute. *Figure 2* further illustrates that letter sound knowledge precedes the ability to decode, and fluency rates of all three skills are related and increase together.

Figure 2: Percentile distribution on all timed subtasks, Akuapem Twi

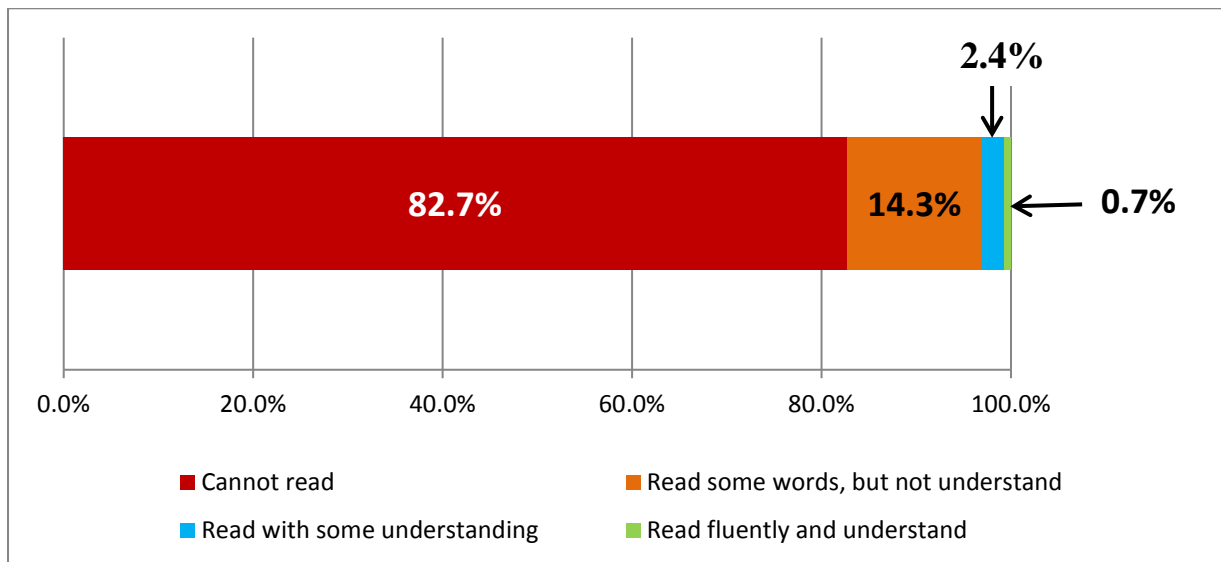


How Well Are Children Reading in Asante Twi?

Overview of Results

The EGRA was administered to 1,634 pupils in schools where Asante Twi was the designated language of instruction. Based on the results of the oral passage reading and reading comprehension subtasks, the state of reading in Asante Twi can be summarised as shown in *Figure 1*:

Figure 1: Distribution of pupils by performance level,³⁰ Asante Twi



- Most pupils (82.7%, $n = 1,372$) were unable to read a single word of the story.
- Some pupils (14.3%, $n = 215$) read 13 correct words per minute, indicating they were just beginning to understand the alphabetic principle (or the relationship between sounds and letters). Not surprisingly, these pupils answered only 6% of the passage questions correctly. These pupils could read some words, but were not yet at a point of being able to understand what they read.
- A small group of pupils (2.4%, $n = 39$) was transitioning from word-by-word identification to increased fluency. On average, these pupils read 32 correct words per minute and answered 50% of the passage questions correctly.
- An even smaller group (0.7%, $n = 8$) had sufficient fluency (automatic and accurate word identification) to focus on comprehension. On average, these pupils read 59 words per minute and answered 82% of the passage questions correctly.

³⁰ The four categories are defined as follows:

- **Cannot read:** oral reading fluency (ORF) score is zero
- **Read some words, but not understand:** ORF score is greater than zero and reading comprehension score is below 60% correct of those attempted
- **Read with some understanding:** reading comprehension score is 60% of those attempted
- **Read fluently and understand:** reading comprehension score is 80% correct of total

Results by Subtask

Table 1: Average EGRA scores in Asante Twi

EGRA subtask	Percentage of pupils who scored zero	Average % correct of items attempted	Average fluency score (all pupils)	Average % correct of items attempted (excluding pupils with zero scores)	Average fluency score (excluding pupils with zero scores)
Listening comprehension	25.8%	40.5%	—	54.5%	—
Letter sound knowledge	50.6%	20.4%	7.7 correct letter sounds per minute	41.4%	15.7 correct letter sounds per minute
Non-word decoding	86.9%	8.0%	2.4 correct non-words per minute	61.4%	18.7 correct non-words per minute
Oral passage reading	82.7%	8.7%	3.0 correct words per minute	50.5%	17.5 correct words per minute
Reading comprehension	92.8% ³¹	4.4% ³²	—	60.1%	—

Listening Comprehension

This subtask measures an important pre-reading skill—the pupils’ ability to listen to and understand oral language. Pupils listened to a short story that was read to them in Asante Twi, and were then asked three questions about the story. A quarter (25.8%) of pupils scored zero (*Table 1*)—they were unable to answer a single question correctly. The overall average score for all pupils was 40.5%. The average score for the pupils who did not score zero on the subtask (i.e., 74.2% of the students) was 54.5%. The data suggest that most pupils were able to understand a story told to them in a familiar language.

Interestingly, but not surprisingly, the analysis showed that pupils who reported speaking a language at home other than Asante Twi were more than 1.5 times as likely³³ to score zero on the listening comprehension subtask as pupils who reported speaking Asante Twi at home.

The performance of the pupils on this subtask in Asante Twi was very different from their performance in English. After listening to a story in English being read to them, 77% of the pupils were unable to answer a single question about the story correctly. This is three times

³¹ This figure includes pupils who were not asked any comprehension questions because they could not read the story passage.

³² Of the total number of items in the reading comprehension subtask (five), the average percentage correct was 2.7%.

³³ Odds ratio = 1.55.

the number for Asante Twi. If these pupils were not regularly communicating in English, it is not surprising that they demonstrated greater oral language comprehension in Asante Twi.

Letter Sound Knowledge

The letter sound knowledge subtask assesses a pupil's ability to produce the sounds of the letters of the alphabet naturally, without hesitation. If children struggle to produce letter sounds, they are unlikely to be able to decode words and read fluently. Half (50.6%) of the pupils were unable to identify the sound of a single letter correctly. The average correct letter sound score was 20.4% out of items attempted at a fluency of 7.7 correct letter sounds per minute (clspm). When pupils scoring zero were removed from the analysis, the average correct letter sound score was 41.4% out of items attempted at a fluency of 15.7 clspm. The pupils who could produce the sound of at least one letter correctly took, on average, almost 4 seconds per letter to produce the sound. This finding suggests that letter sound production was not yet fluent for most of these pupils. Instead, they were having to spend time thinking about each letter. Since letter sound production is important for identifying words (i.e., decoding), and automatic decoding facilitates reading comprehension, their low scores on non-words, passage reading, and comprehension are understandable (*Figure 1*).

Item analysis showed that pupils experienced more difficulty with some letters compared to others. In Asante Twi, pupils had more difficulty with these letters (in both upper- and lower-case): **E, O, E, A, and Y**.

When these pupils were assessed with the English EGRA, 57.2% scored zero on the letter sounds subtask (not shown).

Non-word Decoding

For the non-word decoding subtask, pupils not only must know the sounds of individual letters, but also must be able to blend one sound with the next to correctly decode and say an unfamiliar word. Over three-quarters of pupils (86.9%) were unable to decode non-words in Asante Twi. This is not surprising given the performance on the letter sound knowledge subtask. The overall average score on the non-word decoding subtask was 8.0% correct out of items attempted at a fluency of 2.4 correct non-words per minute. When pupils scoring zero were removed from the analysis, the overall average score on the non-word decoding subtask was 61.4% out of items attempted at a fluency of 18.7 correct non-words per minute, indicating that pupils were just beginning to understand and apply the relationship between sounds and letters.

Performance on the non-word decoding subtask was strongly correlated with performance on the letter sound knowledge subtask, as well as with the oral passage reading subtask (discussed in the next section).³⁴

Slightly fewer of the pupils who completed the Asante Twi EGRA scored zero on the non-word decoding subtask of the English EGRA (80.5%; not shown).

³⁴ Pearson correlation = 0.707 and 0.854, respectively.

Oral Passage Reading

As is depicted in **Figure 1** above, the majority of pupils (82.7%) scored zero on the oral passage reading subtask. The overall average score was 8.7% correct out of items attempted at a fluency of 3.0 correct words per minute (cwpm). Like the non-word reading results, this indicates that these pupils were just learning to decode words. When the pupils scoring zero on this subtask were removed from the analysis, the average score was 50.5% correct out of items attempted at a fluency of 17.5 cwpm. This means that pupils who could read at least one word correctly took, on average, 3.4 seconds to read each word.

A small group of pupils (2.4%) scored at least 60% on the reading comprehension subtask of the questions they attempted to answer. The average oral reading fluency (ORF) score for these pupils was 32 cwpm. This suggests that pupils who were reading 30 cwpm or more were shifting from word-by-word identification to increased fluency.

Pupils classified in **Figure 1** as “reading with comprehension” (0.7% of the pupils) scored at least 80% overall on the reading comprehension subtask, meaning that they correctly answered 4 or all 5 of the comprehension questions. The average ORF score for these few pupils was 59 cwpm.

As is mentioned above, there was a strong relationship between pupil performance on this subtask and the non-word decoding subtask, meaning that pupils who performed well or poorly on one tended to perform similarly on the other.

On the English EGRA, 51.5% of these pupils scored zero on the oral passage reading subtask (not shown) compared with 82.7% for Asante Twi.

Reading Comprehension

As can be seen in **Table 1**, a large majority of pupils (92.8%) were unable to answer a single reading comprehension question correctly in Asante Twi. The average number of questions attempted was less than 1 (0.5 out of a total of 5), and the average score was 4.4% correct of questions attempted. When the pupils scoring zero on this subtask were removed from the analysis, the average score was 60.1% correct out of items attempted. This reflects the lack of fluency with which these pupils were reading. For this subtask, pupils were asked only the questions that corresponded to the amount of the text that they had read. In other words, few pupils were able to read far enough into the passage before the time limit was reached to be asked more than the first comprehension question. In the case of Asante Twi, this meant 5 or more words in one minute.

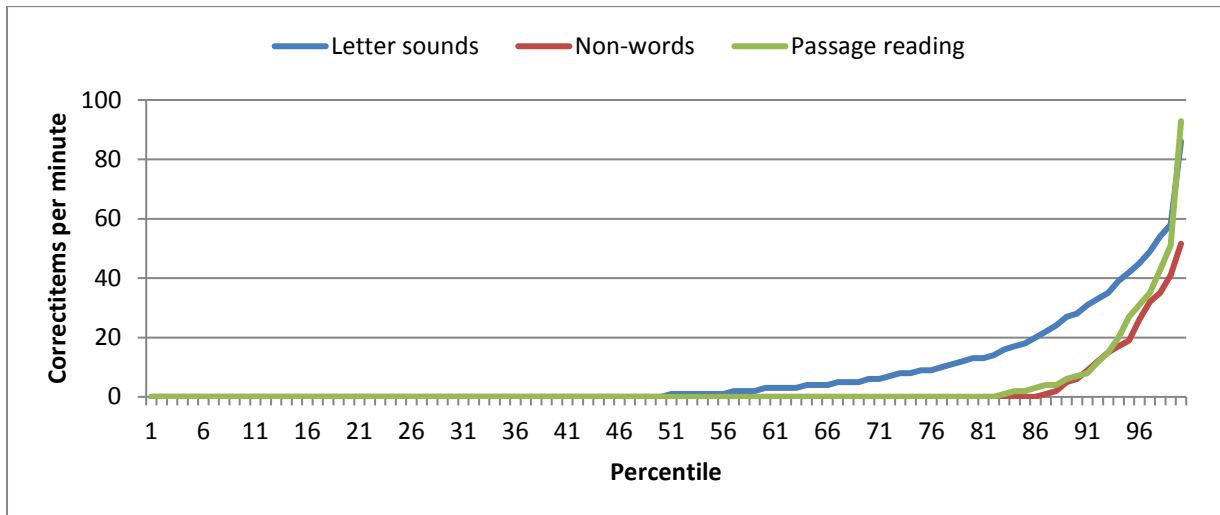
On the English EGRA, 92.1% of these pupils were not able to answer a single reading comprehension question correctly (not shown).

Correct Items per Minute, by Percentile

Finally, **Figure 2** presents the percentile distribution for the three timed subtasks of the Asante Twi EGRA. It shows the corresponding number of correct items per minute for each percentile, and illustrates the relationships among the skills measured by these three subtasks. For example, at about the 90th percentile, on average, pupils were achieving 28 correct letter sounds per minute, 7 correct words per minute on the passage reading subtask, and 6 correct

non-words per minute. *Figure 2* further illustrates that letter sound knowledge precedes the ability to decode, and fluency rates of all three skills are related and increase together.

Figure 2: Percentile distribution on all timed subtasks, Asante Twi

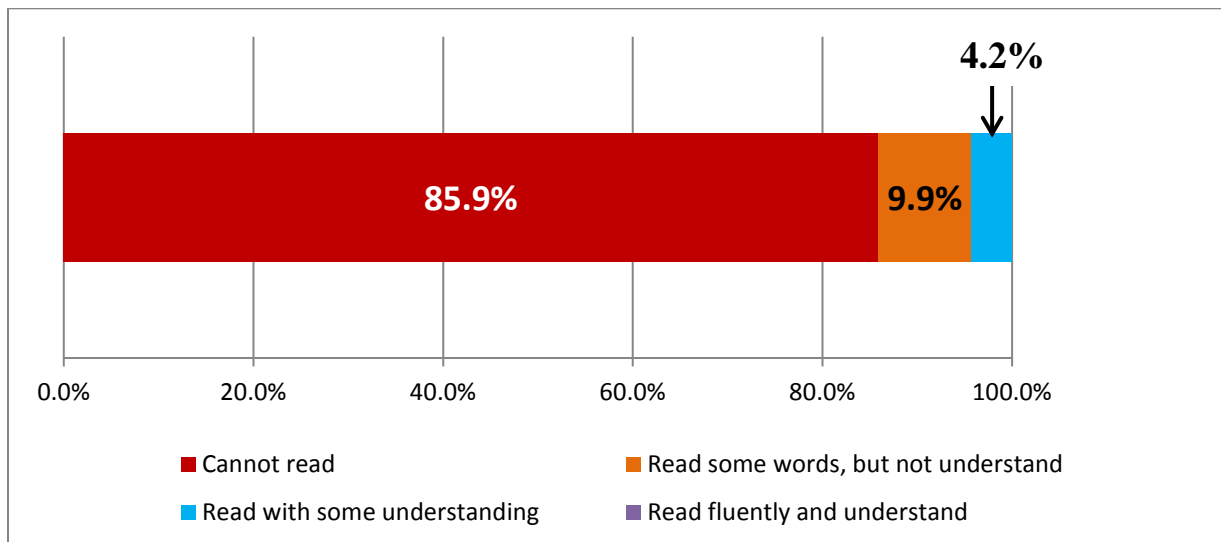


How Well Are Children Reading in Dagaare?

Overview of Results

The EGRA was administered to 541 pupils in schools where Dagaare was the designated language of instruction. Based on the results of the oral passage reading and reading comprehension subtasks, the state of reading in Dagaare can be summarised as shown in *Figure 1*:

Figure 1: Distribution of pupils by performance level,³⁵ Dagaare



- Most pupils (85.9%, $n = 479$) were unable to read a single word of the story.
- Many pupils (9.9%, $n = 45$) read 9.5 correct words per minute, indicating they were just beginning to understand the alphabetic principle (or the relationship between sounds and letters). Not surprisingly, these pupils answered only 4% of the passage questions correctly. These pupils could read some words, but were not yet at a point of being able to understand what they read.
- A small group of pupils (4.2%, $n = 17$) was transitioning from word-by-word identification to increased fluency. On average, these pupils read 20.4 correct words per minute and answered 43% of the passage questions correctly.
- None of the pupils had sufficient fluency (automatic and accurate word identification) to focus on comprehension.

³⁵ The four categories are defined as follows:

- **Cannot read:** oral reading fluency (ORF) score is zero
- **Read some words, but not understand:** ORF score is greater than zero and reading comprehension score is below 60% correct of those attempted
- **Read with some understanding:** reading comprehension score is 60% of those attempted
- **Read fluently and understand:** reading comprehension score is 80% correct of total

Results by Subtask

Table 1: Average EGRA scores in Dagaare

EGRA subtask	Percentage of pupils who scored zero	Average % correct of items attempted	Average fluency score (all pupils)	Average % correct of items attempted (excluding pupils with zero scores)	Average fluency score (excluding pupils with zero scores)
Listening comprehension	39.7%	47.1%	—	78.1%	—
Letter sound knowledge	64.7%	11.3%	3.0 correct letter sounds per minute	31.9%	8.3 correct letter sounds per minute
Non-word decoding	91.5%	3.6%	0.9 correct non-words per minute	42.7%	10.0 correct non-words per minute
Oral passage reading	85.9%	6.5%	1.8 correct words per minute	46.0%	12.8 correct words per minute
Reading comprehension	94.3% ³⁶	4.4% ³⁷	—	77.0%	—

Listening Comprehension

This subtask measures an important pre-reading skill—the pupils’ ability to listen to and understand oral language. Pupils listened to a short story that was read to them in Dagaare, and were then asked three questions about the story. Many pupils (39.7%) scored zero (*Table 1*)—they were unable to answer a single question correctly. The overall average score for all pupils was 47.1%. The average score for the pupils who did not score zero on the subtask (i.e., 60.3% of the students) was 78.1%. The data suggest that most pupils were able to understand a story told to them in a familiar language.

Interestingly, but not surprisingly, the analysis showed that pupils who reported speaking a language at home other than Dagaare were more than 19 times more likely³⁸ to score zero on the listening comprehension subtask as pupils who reported speaking Dagaare at home.

The performance of the pupils on this subtask in Dagaare was very different from their performance in English. After listening to a story in English being read to them, 81% of the

³⁶ This figure includes pupils who were not asked any comprehension questions because they could not read the story passage.

³⁷ Of the total number of items in the reading comprehension subtask (five), the average percentage correct was 2.2%.

³⁸ Odds ratio = 19.5

pupils were unable to answer a single question about the story correctly. This is two times the number for Dagaare. If these pupils were not regularly communicating in English, it is not surprising that they demonstrated greater oral language comprehension in Dagaare.

Letter Sound Knowledge

The letter sound knowledge subtask assesses a pupil's ability to produce the sounds of the letters of the alphabet naturally, without hesitation. If children struggle to produce letter sounds, they are unlikely to be able to decode words and read fluently. Almost two-thirds (64.7%) of the pupils were unable to identify the sound of a single letter correctly. The overall average correct letter sound score was 11.3% out of items attempted at a fluency of 3.0 correct letter sounds per minute (clsmpm). When pupils scoring zero were removed from the analysis, the average correct letter sound score was 31.9% out of items attempted at a fluency of 8.3 clsmpm. The pupils who could produce the sound of at least one letter correctly took, on average, 7.2 seconds per letter to produce the sound. This finding suggests that letter sound production was not yet fluent for most of these pupils. Instead, they were having to spend time thinking about each letter. Since letter sound production is important for identifying words (i.e., decoding), and automatic decoding facilitates reading comprehension, their low scores on non-words, passage reading, and comprehension are understandable (*Figure 1*).

When these pupils were assessed with the English EGRA, 71.7% scored zero on the letter sounds subtask (not shown).

Non-word Decoding

For the non-word decoding subtask, pupils not only must know the sounds of individual letters, but also must be able to blend one sound with the next to correctly decode and say an unfamiliar word. Most pupils (91.5%) were unable to decode non-words in Dagaare. This is not surprising given the performance on the letter sound knowledge subtask. The average score on the non-word decoding subtask was 3.6% correct out of items attempted at a fluency of 0.9 correct non-words per minute. When pupils scoring zero were removed from the analysis, the average score on the non-word decoding subtask was 42.7% correct out of items attempted at a fluency of 10.0 correct non-words per minute, indicating that pupils were just beginning to understand and apply the relationship between sounds and letters.

Performance on the non-word decoding subtask was strongly correlated with performance on the letter sound knowledge subtask, as well as with the oral passage reading subtask (discussed in the next section).³⁹

A comparable proportion of the pupils who completed the Dagaare EGRA scored zero on the non-word decoding subtask of the English EGRA as well (89.3%; not shown).

Oral Passage Reading

As is depicted in *Figure 1* above, the majority of pupils (85.9%) scored zero on the oral passage reading subtask. The average score was 6.5% correct out of items attempted at a fluency of 1.8 correct words per minute (cwpm). Like the non-word reading results, this

³⁹ Pearson correlation = 0.631 and 0.760, respectively.

indicates that these pupils were just learning to decode words. When the pupils scoring zero on this subtask were removed from the analysis, the average score was 46.0% correct out of items attempted at a fluency of 12.8 cwpm. This means that pupils who could read at least one word correctly took, on average, 4.7 seconds to read each word.

A small group of pupils (4.2%) scored at least 60% on the reading comprehension subtask of the questions they attempted to answer. The average oral reading fluency (ORF) score for these pupils was 20 cwpm. This suggests that pupils who were reading 20 cwpm or more were shifting from word-by-word identification to increased fluency.

Note that no pupils were classified in *Figure 1* as “reading with comprehension” in Dagaare. To be designated as reading with comprehension, pupils had to attain scores of at least 80% overall on the reading comprehension subtask, meaning that they correctly answered 4 or all 5 of the comprehension questions.

As is mentioned above, there was a strong relationship between pupil performance on this subtask and the non-word decoding subtask, meaning that pupils who performed well or poorly on one tended to perform similarly on the other.

On the English EGRA, 62.3% of these pupils scored zero on the oral passage reading subtask (not shown), compared with 85.9% for Dagaare.

Reading Comprehension

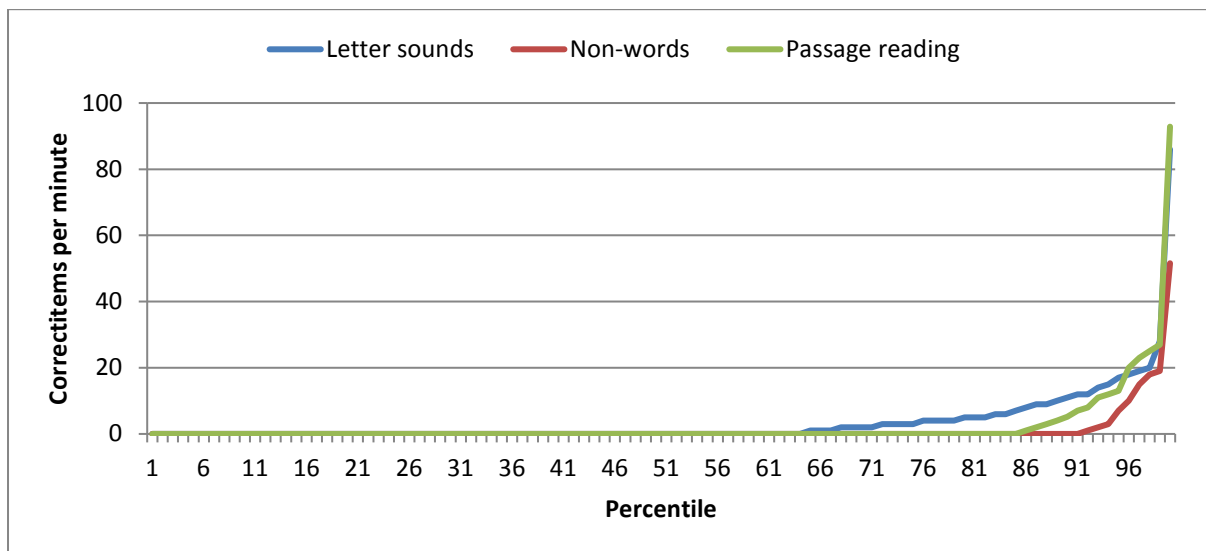
As can be seen in *Table 1*, a large majority of pupils (94.3%) were unable to answer a single reading comprehension question correctly in Dagaare. The average number of questions attempted was less than 1 (0.3 out of a total of 5), and the average score was 4.4% correct of questions attempted. When the pupils scoring zero on this subtask were removed from the analysis, the average score was 77.0% correct out of items attempted. This reflects the lack of fluency with which these pupils were reading. For this subtask, pupils were asked only the questions that corresponded to the amount of the text that they had read. In other words, few pupils were able to read far enough into the passage before the time limit was reached to be asked more than the first comprehension question. In the case of Dagaare, this meant 12 or more words in one minute.

On the English EGRA, 92.1% of these pupils were not able to answer a single reading comprehension question correctly (not shown).

Correct Items per Minute, by Percentile

Finally, *Figure 2* presents the percentile distribution for the three timed subtasks of the Dagaare EGRA. It shows the corresponding number of correct items per minute for each percentile, and illustrates the relationships among the skills measured by these three subtasks. For example, at about the 90th percentile, on average, pupils were achieving 11 correct letter sounds per minute, 5 correct words per minute on the passage reading subtask, and 0 correct non-words per minute. *Figure 2* further illustrates that letter sound knowledge precedes the ability to decode, and fluency rates of all three skills are related and increase together.

Figure 2: Percentile distribution on all timed subtasks, Dagaare

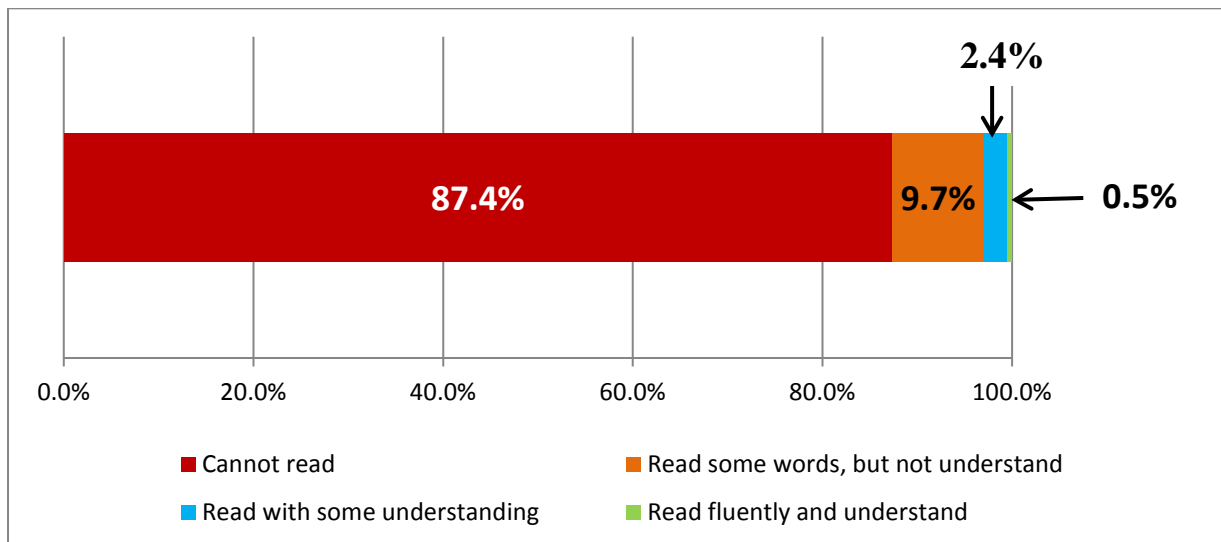


How Well Are Children Reading in Dagbani?

Overview of Results

The EGRA was administered to 432 pupils in schools where Dagbani was the designated language of instruction. Based on the results of the oral passage reading and reading comprehension subtasks, the state of reading in Dagbani can be summarised as shown in *Figure 1*:

Figure 1: Distribution of pupils by performance level,⁴⁰ Dagbani



- Most pupils (87.4%, $n = 377$) were unable to read a single word of the story.
- Many pupils (9.7%, $n = 44$) read 8 correct words per minute, indicating they were just beginning to understand the alphabetic principle (or the relationship between sounds and letters). Not surprisingly, these pupils answered only 4% of the passage questions correctly. These pupils could read some words, but were not yet at a point of being able to understand what they read.
- A small group of pupils (2.4%, $n = 8$) was transitioning from word-by-word identification to increased fluency. On average, these pupils read 23 correct words per minute and answered 44% of the passage questions correctly.
- An even smaller group (0.5%, $n = 3$) had sufficient fluency (automatic and accurate word identification) to focus on comprehension. On average, these pupils read 49 words per minute and answered 80% of the passage questions correctly.

⁴⁰ The four categories are defined as follows:

- **Cannot read:** oral reading fluency (ORF) score is zero
- **Read some words, but not understand:** ORF score is greater than zero and reading comprehension score is below 60% correct of those attempted
- **Read with some understanding:** reading comprehension score is 60% of those attempted
- **Read fluently and understand:** reading comprehension score is 80% correct of total

Results by Subtask

Table 1: Average EGRA scores in Dagbani

EGRA subtask	Percentage of pupils who scored zero	Average % correct of items attempted	Average fluency score (all pupils)	Average % correct of items attempted (excluding pupils with zero scores)	Average fluency score (excluding pupils with zero scores)
Listening comprehension	35.3%	36.6%	—	56.6%	—
Letter sound knowledge	62.6%	15.6%	4.2 correct letter sounds per minute	41.7%	11.1 correct letter sounds per minute
Non-word decoding	90.0%	5.0%	1.0 correct non-words per minute	49.7%	9.6 correct non-words per minute
Oral passage reading	87.4%	6.5%	1.6 correct words per minute	51.6%	12.5 correct words per minute
Reading comprehension	95.2% ⁴¹	3.2% ⁴²	—	65.6%	—

Listening Comprehension

This subtask measures an important pre-reading skill—the pupils’ ability to listen to and understand oral language. Pupils listened to a short story that was read to them in Dagbani, and were then asked three questions about the story. A third (35.3%) of pupils scored zero (*Table 1*)—they were unable to answer a single question correctly. The overall average score for all pupils was 36.6%. The average score for the pupils who did not score zero on the subtask (i.e., 64.7% of the students) was 56.6%. The data suggest that most pupils were able to understand a story told to them in a familiar language.

Interestingly, but not surprisingly, the analysis showed that pupils who reported speaking a language at home other than Dagbani were more than seven times as likely⁴³ to score zero on the listening comprehension subtask as pupils who reported speaking Dagbani at home.

The performance of the pupils on this subtask in Dagbani was very different from their performance in English. After listening to a story in English being read to them, 79% of the pupils were unable to answer a single question about the story correctly. This is three times

⁴¹ This figure includes pupils who were not asked any comprehension questions because they could not read the story passage.

⁴² Of the total number of items in the reading comprehension subtask (five), the average percentage correct was 1.9%.

⁴³ Odds ratio = 8.0

the number for Dagbani. If these pupils were not regularly communicating in English, it is not surprising that they demonstrated greater oral language comprehension in Dagbani.

Letter Sound Knowledge

The letter sound knowledge subtask assesses a pupil's ability to produce the sounds of the letters of the alphabet naturally, without hesitation. If children struggle to produce letter sounds, they are unlikely to be able to decode words and read fluently. Almost two thirds (62.6%) of the pupils were unable to identify the sound of a single letter correctly. The average correct letter sound score was 15.6% out of items attempted at a fluency of 4.2 correct letter sounds per minute (clspm). When pupils scoring zero were removed from the analysis, the average correct letter sound score was 41.7% out of items attempted at a fluency of 11.1 clspm. The pupils who could produce the sound of at least one letter correctly took, on average, 5.4 seconds per letter to produce the sound. This finding suggests that letter sound production was not yet fluent for most of these pupils. Instead, they were having to spend time thinking about each letter. Since letter sound production is important for identifying words (i.e., decoding), and automatic decoding facilitates reading comprehension, their low scores on non-words, passage reading, and comprehension are understandable (*Figure 1*).

Item analysis showed that pupils experienced more difficulty with some letters compared to others. In Dagbani, pupils had more difficulty with these letters (in both upper- and lower-case): **K, M, E, and L**.

When these pupils were assessed with the English EGRA, 68.7% scored zero on the letter sounds subtask (not shown).

Non-word Decoding

For the non-word decoding subtask, pupils not only must know the sounds of individual letters, but also must be able to blend one sound with the next to correctly decode and say an unfamiliar word. Most pupils (90.0%) were unable to decode non-words in Dagbani. This is not surprising given the performance on the letter sound knowledge subtask. The average score on the non-word decoding subtask was 5.0% correct of items attempted at a fluency of 1.0 correct non-words per minute. When pupils scoring zero were removed from the analysis, the average score on the non-word decoding subtask was 49.7% correct out of items attempted at a fluency of 9.6 correct non-words per minute, indicating that pupils were just beginning to understand and apply the relationship between sounds and letters.

Performance on the non-word decoding subtask was strongly correlated with performance on the letter sound knowledge subtask, as well as with the oral passage reading subtask (discussed in the next section).⁴⁴

Slightly fewer of the pupils who completed the Dagbani EGRA scored zero on the non-word decoding subtask of the English EGRA (85.5%; not shown).

⁴⁴ Pearson correlation = 0.589 and 0.812, respectively.

Oral Passage Reading

As is depicted in **Figure 1** above, the majority of pupils (87.4%) scored zero on the oral passage reading subtask. The average score was 6.5% correct out of items attempted at a fluency of 1.6 correct words per minute (cwpm). Like the non-word reading results, this indicates that these pupils were just learning to decode words. When the pupils scoring zero on this subtask were removed from the analysis, the average score was 51.6% correct out of items attempted at a fluency of 12.5 cwpm. This means that pupils who could read at least one word correctly took, on average, 4.8 seconds to read each word.

A small group of pupils (2.4%) scored at least 60% on the reading comprehension subtask of the questions they attempted to answer. The average oral reading fluency (ORF) score for these pupils was 23 cwpm. This suggests that pupils who were reading 20 cwpm or more were shifting from word-by-word identification to increased fluency.

Pupils classified in **Figure 1** as “reading with comprehension” (0.5% of the pupils) scored at least 80% overall on the reading comprehension subtask, meaning that they correctly answered 4 or all 5 of the comprehension questions. The average ORF score for these few pupils was 49 cwpm.

As is mentioned above, there was a strong relationship between pupil performance on this subtask and the non-word decoding subtask, meaning that pupils who performed well or poorly on one tended to perform similarly on the other.

On the English EGRA, 71.6% of these pupils scored zero on the oral passage reading subtask (not shown), compared with 87.4% for Dagbani.

Reading Comprehension

As can be seen in **Table 1**, a large majority of pupils (95.2%) were unable to answer a single reading comprehension question correctly in Dagbani. The average number of questions attempted was less than 1 (0.3 out of a total of 5), and the average score was 3.2% correct of questions attempted. When the pupils scoring zero on this subtask were removed from the analysis, the average score was 65.6% correct out of items attempted. This reflects the lack of fluency with which these pupils were reading. For this subtask, pupils were asked only the questions that corresponded to the amount of the text that they had read. In other words, few pupils were able to read far enough into the passage before the time limit was reached to be asked more than the first comprehension question. In the case of Dagbani, this meant 7 or more words in one minute.

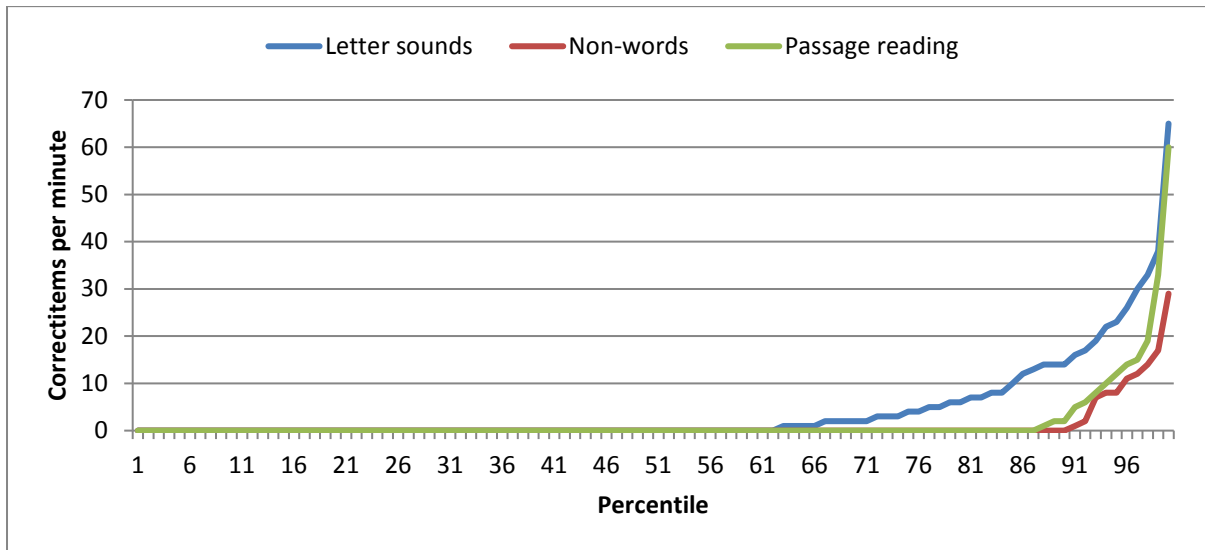
On the English EGRA, 97.5% of these pupils were not able to answer a single reading comprehension question correctly (not shown).

Correct Items per Minute, by Percentile

Finally, **Figure 2** presents the percentile distribution for the three timed subtasks of the Dagbani EGRA. It shows the corresponding number of correct items per minute for each percentile, and illustrates the relationships among the skills measured by these three subtasks. For example, at about the 90th percentile, on average, pupils were achieving 14 correct letter sounds per minute, 2 correct words per minute on the passage reading subtask, and 0 correct

non-words per minute. **Figure 2** further illustrates that letter sound knowledge precedes the ability to decode, and fluency rates of all three skills are related and increase together.

Figure 2: Percentile distribution on all timed subtasks, Dagbani

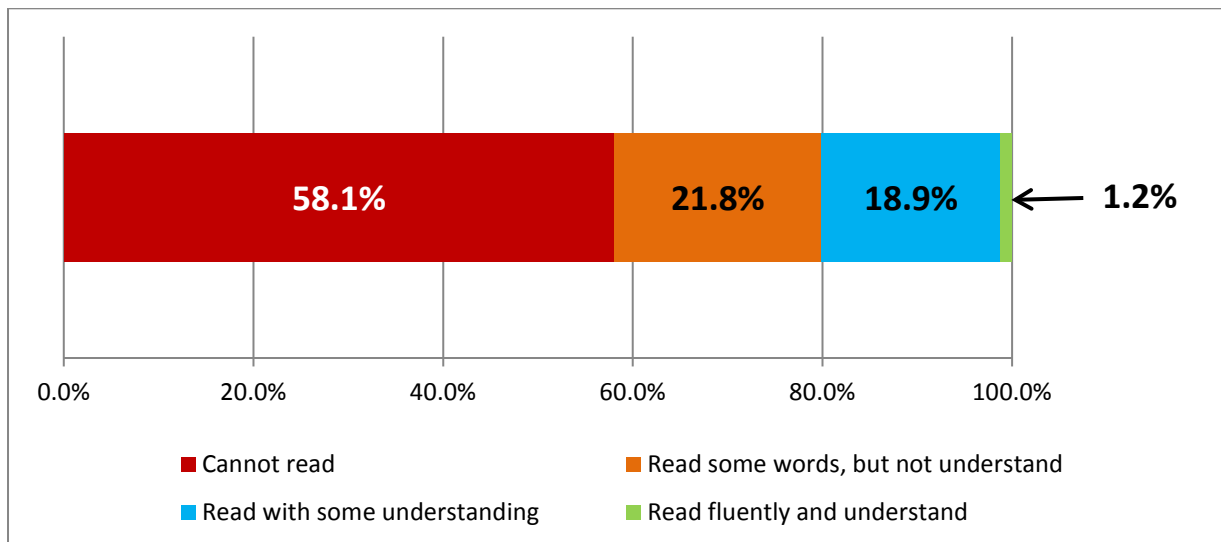


How Well Are Children Reading in Dangme?

Overview of Results

The EGRA was administered to 447 pupils in schools where Dangme was the designated language of instruction. Based on the results of the oral passage reading and reading comprehension subtasks, the state of reading in Dangme can be summarised as shown in *Figure 1*:

Figure 1: Distribution of pupils by performance level,⁴⁵ Dangme



- Most pupils (58.1%, $n = 293$) were unable to read a single word of the story.
- Many pupils (21.8%, $n = 84$) read 8 correct words per minute, indicating they were just beginning to understand the alphabetic principle (or the relationship between sounds and letters). Not surprisingly, these pupils answered only 7% of the passage questions correctly. These pupils could read some words, but were not yet at a point of being able to understand what they read.
- Some pupils (18.9%, $n = 66$) were transitioning from word-by-word identification toward the beginnings of fluency. On average, these pupils read 12 correct words per minute and answered 26% of the passage questions correctly. While their fluency rate was quite low, and thus they did not read very far into the story passage, these pupils did show some understanding of what they did read.

⁴⁵ The four categories are defined as follows:

- **Cannot read:** oral reading fluency (ORF) score is zero
- **Read some words, but not understand:** ORF score is greater than zero and reading comprehension score is below 60% correct of those attempted
- **Read with some understanding:** reading comprehension score is 60% of those attempted
- **Read fluently and understand:** reading comprehension score is 80% correct of total

- A small group of pupils (1.2%, $n = 4$) had sufficient fluency (automatic and accurate word identification) to focus on comprehension. On average, these pupils read 67 words per minute and answered 91% of the passage questions correctly.

Results by Subtask

Table 1: Average EGRA scores in Dangme

EGRA subtask	Percentage of pupils who scored zero	Average % correct of items attempted	Average fluency score (all pupils)	Average % correct of items attempted (excluding pupils with zero scores)	Average fluency score (excluding pupils with zero scores)
Listening comprehension	11.6%	44.0%	—	49.7%	—
Letter sound knowledge	16.1%	33.3%	12.0 correct letter sounds per minute	39.7%	14.3 correct letter sounds per minute
Non-word decoding	73.6%	10.8%	2.7 correct non-words per minute	41.0%	10.1 correct non-words per minute
Oral passage reading	58.1%	15.2%	4.7 correct words per minute	36.3%	11.3 correct words per minute
Reading comprehension	72.1% ⁴⁶	23.5% ⁴⁷	—	84.1%	—

Listening Comprehension

This subtask measures an important pre-reading skill—the pupils’ ability to listen to and understand oral language. Pupils listened to a short story that was read to them in Dangme, and were then asked three questions about the story. Few pupils (11.6%) scored zero (*Table 1*), meaning that they were unable to answer a single question correctly. The overall average score for all pupils was 44.0%. The average score for the pupils who did not score zero on the subtask (i.e., 88.4% of the students) was 49.7%. The data suggest that most pupils were able to understand some of a story told to them in a familiar language.

Interestingly, but not surprisingly, the analysis showed that pupils who reported speaking a language at home other than Dangme were more than three times as likely⁴⁸ to score zero on the listening comprehension subtask as pupils who reported speaking Dangme at home.

⁴⁶ This figure includes pupils who were not asked any comprehension questions because they could not read the story passage.

⁴⁷ Of the total number of items in the reading comprehension subtask (five), the average percentage correct was 7.6%.

⁴⁸ Odds ratio = 3.2

The performance of the pupils on this subtask in Dangme was very different from their performance in English. After listening to a story in English being read to them, 63% of the pupils were unable to answer a single question about the story correctly. This is about five times the number for Dangme. If these pupils were not regularly communicating in English, it is not surprising that they demonstrated greater oral language comprehension in Dangme.

Letter Sound Knowledge

The letter sound knowledge subtask assesses a pupil's ability to produce the sounds of the letters of the alphabet naturally, without hesitation. If children struggle to produce letter sounds, they are unlikely to be able to decode words and read fluently. Almost one in six pupils (16.1%) were unable to identify the sound of a single letter correctly. The average correct letter sound score was 33.3% out of items attempted at a fluency of 12.0 correct letter sounds per minute (clspm). When pupils scoring zero were removed from the analysis, the average correct letter sound score was 39.7% out of items attempted at a fluency of 14.3 clspm. The pupils who could produce the sound of at least one letter correctly took, on average, 4.2 seconds per letter to produce the sound. This finding suggests that letter sound production was not yet fluent for most of these pupils. Instead, they were having to spend time thinking about each letter. Since letter sound production is important for identifying words (i.e., decoding), and automatic decoding facilitates reading comprehension, their low scores on non-words, passage reading, and comprehension are understandable (**Figure 1**).

Item analysis showed that pupils experienced more difficulty with some letters compared to others. In Dangme, pupils had more difficulty with these letters (in both upper- and lower-case): **Y, Ń, Ę, and L**.

When these pupils were assessed with the English EGRA, 37.6% scored zero on the letter sounds subtask (not shown).

Non-word Decoding

For the non-word decoding subtask, pupils not only must know the sounds of individual letters, but also must be able to blend one sound with the next to correctly decode and say an unfamiliar word. Most pupils (73.6%) were unable to decode non-words in Dangme. This is not surprising given the performance on the letter sound knowledge subtask. The average score on the non-word decoding subtask was 10.8% correct out of items attempted at a fluency of 2.7 correct non-words per minute. When pupils scoring zero were removed from the analysis, the average score on the non-word decoding subtask was 41.0% correct out of items attempted at a fluency of 10.1 correct non-words per minute, indicating that pupils were just beginning to understand and apply the relationship between sounds and letters.

Performance on the non-word decoding subtask was strongly correlated with performance on the letter sound knowledge subtask, as well as with the oral passage reading subtask (discussed in the next section).⁴⁹

Slightly fewer of the pupils who completed the Dangme EGRA scored zero on the non-word decoding subtask of the English EGRA (69.3%; not shown).

⁴⁹ Pearson correlation = 0.695 and 0.820, respectively.

Oral Passage Reading

As is depicted in **Figure 1** above, the majority of pupils (58.1%) scored zero on the oral passage reading subtask. The average score was 15.2% correct out of items attempted at a fluency of 4.7 correct words per minute (cwpm). Like the non-word reading results, this indicates that these pupils were just learning to decode words. When the pupils scoring zero on this subtask were removed from the analysis, the average score was 36.3% correct out of items attempted at a fluency of 11.3 cwpm. This means that pupils who could read at least one word correctly took, on average, 5.3 seconds to read each word.

About one in five pupils (18.9%) scored at least 60% on the reading comprehension subtask of the questions they attempted to answer. The average oral reading fluency (ORF) score for these pupils was 12 cwpm. While their fluency rate was quite low, and thus they did not read very far into the story passage, these pupils did show some understanding of what they did read.

Pupils classified in **Figure 1** as “reading with comprehension” (1.2% of the pupils) scored at least 80% overall on the reading comprehension subtask, meaning that they correctly answered 4 or all 5 of the comprehension questions. The average ORF score for these few pupils was 67 cwpm.

As is mentioned above, there was a strong relationship between pupil performance on this subtask and the non-word decoding subtask, meaning that pupils who performed well or poorly on one tended to perform similarly on the other.

On the English EGRA, 34.8% of these pupils scored zero on the oral passage reading subtask (not shown) compared with 58.1% for Dangme.

Reading Comprehension

As can be seen in **Table 1**, a large majority of pupils (72.1%) were unable to answer a single reading comprehension question correctly in Dangme. The average number of questions attempted was less than 1 (0.7 out of a total of 5), and the average score was 23.5% correct of questions attempted. When the pupils scoring zero on this subtask were removed from the analysis, the average score was 84.1% correct out of items attempted. This reflects the lack of fluency with which these pupils were reading. For this subtask, pupils were asked only the questions that corresponded to the amount of the text that they had read. In other words, few pupils were able to read far enough into the passage before the time limit was reached to be asked more than the first comprehension question. In the case of Dangme, this meant 13 or more words in one minute.

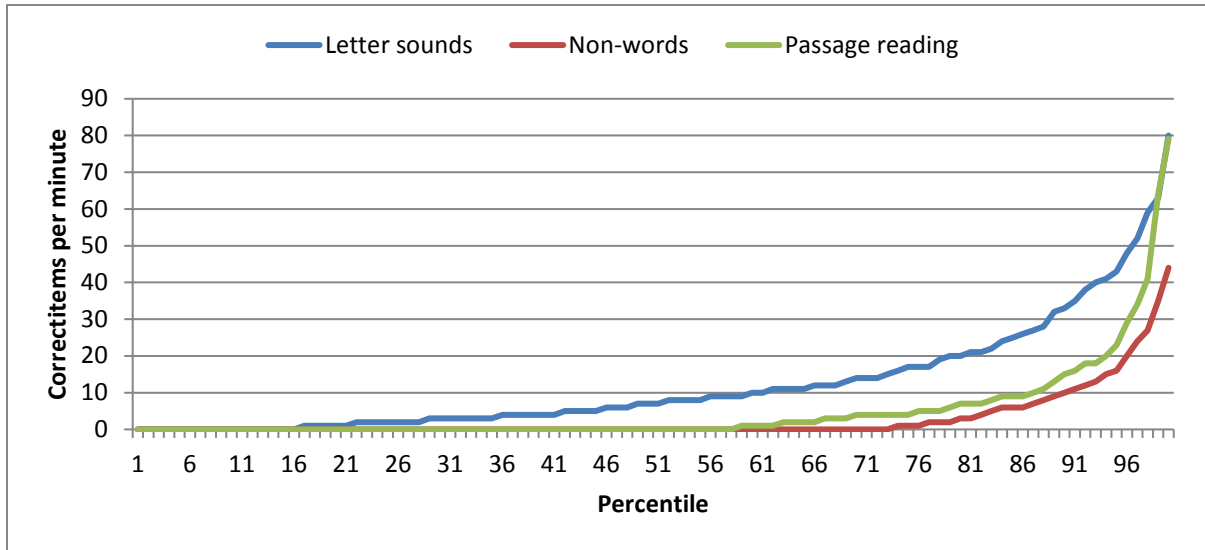
On the English EGRA, 81.2% of these pupils were not able to answer a single reading comprehension question correctly (not shown).

Correct Items per Minute, by Percentile

Finally, **Figure 2** presents the percentile distribution for the three timed subtasks of the Dangme EGRA. It shows the corresponding number of correct items per minute for each percentile, and illustrates the relationships among the skills measured by these three subtasks. For example, at about the 80th percentile, on average, pupils were achieving 20 correct letter

sounds per minute, 7 correct words per minute on the passage reading subtask, and 3 correct non-words per minute. **Figure 2** further illustrates that letter sound knowledge precedes the ability to decode, and fluency rates of all three skills are related and increase together.

Figure 2: Percentile distribution on all timed subtasks, Dangme

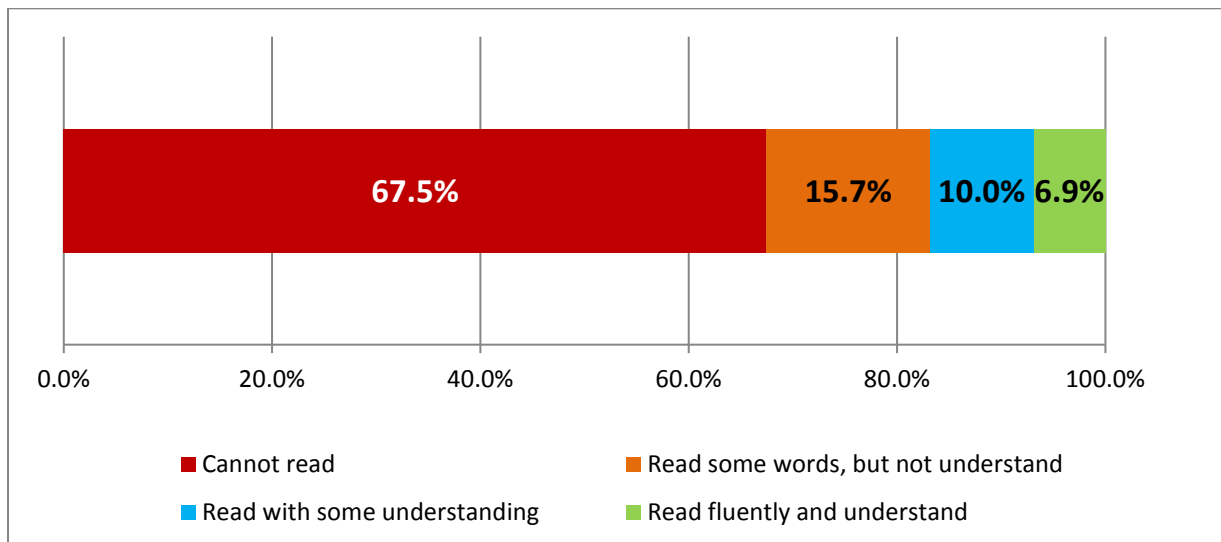


How Well Are Children Reading in Ewe?

Overview of Results

The EGRA was administered to 492 pupils in schools where Ewe was the designated language of instruction. Based on the results of the oral passage reading and reading comprehension subtasks, the state of reading in Ewe can be summarized as shown in *Figure 1*:

Figure 1: Distribution of pupils by performance level,⁵⁰ Ewe



- Most pupils (67.5%, $n = 335$) were unable to read a single word of the story.
- Some pupils (15.7%, $n = 71$) read 17 correct words per minute, indicating they were just beginning to understand the alphabetic principle (or the relationship between sounds and letters). Not surprisingly, these pupils answered only 8% of the passage questions correctly. These pupils could read some words, but were not yet at a point of being able to understand what they read.
- A small group of pupils (10.0%, $n = 41$) was transitioning from word-by-word identification to increased fluency. On average, these pupils read 35 correct words per minute and answered 54% of the passage questions correctly.
- A smaller group (6.9%, $n = 25$) had sufficient fluency (automatic and accurate word identification) to focus on comprehension. On average, these pupils read 65 words per minute and answered 84% of the passage questions correctly.

⁵⁰ The four categories are defined as follows:

- **Cannot read:** oral reading fluency (ORF) score is zero
- **Read some words, but not understand:** ORF score is greater than zero and reading comprehension score is below 60% correct of those attempted
- **Read with some understanding:** reading comprehension score is 60% of those attempted
- **Read fluently and understand:** reading comprehension score is 80% correct of total

Results by Subtask

Table 1: Average EGRA scores in Ewe

EGRA subtask	Percentage of pupils who scored zero	Average % correct of items attempted	Average fluency score (all pupils)	Average % correct of items attempted (excluding pupils with zero scores)	Average fluency score (excluding pupils with zero scores)
Listening comprehension	10.3%	61.2%	—	68.2%	—
Letter sound knowledge	35.0%	33.3%	15.6 correct letter sounds per minute	51.2%	24.1 correct letter sounds per minute
Non-word decoding	70.0%	17.2%	6.3 correct non-words per minute	57.2%	20.9 correct non-words per minute
Oral passage reading	67.5%	19.1%	8.1 correct words per minute	58.7%	25.0 correct words per minute
Reading comprehension	78.3% ⁵¹	15.4% ⁵²	—	70.7%	—

Listening Comprehension

This subtask measures an important pre-reading skill—the pupils’ ability to listen to and understand oral language. Pupils listened to a short story that was read to them in Ewe, and were then asked three questions about the story. One in ten pupils (10.3%) scored zero (*Table 1*)—they were unable to answer a single question correctly. The overall average score for all pupils was 61.2%. The average score for the pupils who did not score zero on the subtask (i.e., 89.7% of the students) was 68.2%. The data suggest that most pupils were able to understand a story told to them in a familiar language.

Interestingly, but not surprisingly, the analysis showed that pupils who reported speaking a language at home other than Ewe were almost 10 times as likely⁵³ to score zero on the listening comprehension subtask as pupils who reported speaking Ewe at home.

The performance of the pupils on this subtask in Ewe was very different from their performance in English. After listening to a story in English being read to them, 70% of the pupils were unable to answer a single question about the story correctly. This is seven times

⁵¹ This figure includes pupils who were not asked any comprehension questions because they could not read the story passage.

⁵² Of the total number of items in the reading comprehension subtask (five), the average percentage correct was 12.5%.

⁵³ Odds ratio = 9.8

the number for Ewe. If these pupils were not regularly communicating in English, it is not surprising that they demonstrated greater oral language comprehension in Ewe.

Letter Sound Knowledge

The letter sound knowledge subtask assesses a pupil's ability to produce the sounds of the letters of the alphabet naturally, without hesitation. If children struggle to produce letter sounds, they are unlikely to be able to decode words and read fluently. About one third (35.0%) of the pupils were unable to identify the sound of a single letter correctly. The average correct letter sound score was 33.3% out of items attempted at a fluency of 15.6 correct letter sounds per minute (clspm). When pupils scoring zero were removed from the analysis, the average correct letter sound score was 51.2% out of items attempted at a fluency of 24.1 clspm. The pupils who could produce the sound of at least one letter correctly took, on average, 2.5 seconds per letter to produce the sound. This finding suggests that letter sound production was not yet fluent for most of these pupils. Instead, they were having to spend time thinking about each letter. Since letter sound production is important for identifying words (i.e., decoding), and automatic decoding facilitates reading comprehension, their low scores on non-words, passage reading, and comprehension are understandable (*Figure 1*).

Item analysis showed that pupils experienced more difficulty with some letters compared to others. In Ewe, pupils had more difficulty with these letters (in both upper- and lower-case): **E, X, e, F, W, w, and Y.**

When these pupils were assessed with the English EGRA, 42.7% scored zero on the letter sounds subtask (not shown).

Non-word Decoding

For the non-word decoding subtask, pupils not only must know the sounds of individual letters, but also must be able to blend one sound with the next to correctly decode and say an unfamiliar word. Over two-thirds of pupils (70.0%) were unable to decode non-words in Ewe. This is not surprising given the performance on the letter sound knowledge subtask. The average score on the non-word decoding subtask was 17.2% correct out of items attempted at a fluency of 6.3 correct non-words per minute. When pupils scoring zero were removed from the analysis, the overall average score on the non-word decoding subtask was 57.2% correct out of items attempted at a fluency of 20.9 correct non-words per minute, indicating that pupils were just beginning to understand and apply the relationship between sounds and letters.

Performance on the non-word decoding subtask was strongly correlated with performance on the letter sound knowledge subtask, as well as with the oral passage reading subtask (discussed in the next section).⁵⁴

Slightly fewer of the pupils who completed the Ewe EGRA scored zero on the non-word decoding subtask of the English EGRA (66.8%; not shown).

⁵⁴ Pearson correlation = 0.842 and 0.831, respectively.

Oral Passage Reading

As is depicted in **Figure 1** above, the majority of pupils (67.5%) scored zero on the oral passage reading subtask. The average score was 19.1% correct out of items attempted at a fluency of 8.1 correct words per minute (cwpm). Like the non-word reading results, this indicates that these pupils were just learning to decode words. When the pupils scoring zero on this subtask were removed from the analysis, the average score was 58.7% correct out of items attempted at a fluency of 25.0 cwpm. This means that pupils who could read at least one word correctly took, on average, almost 2.4 seconds to read each word.

A small group of pupils (10.0%) scored at least 60% on the reading comprehension subtask of the questions they attempted to answer. The average oral reading fluency (ORF) score for these pupils was 35 cwpm. This suggests that pupils who were reading 35 cwpm or more were shifting from word-by-word identification to increased fluency.

Pupils classified in **Figure 1** as “reading with comprehension” (6.9% of the pupils) scored at least 80% overall on the reading comprehension subtask, meaning that they correctly answered 4 or all 5 of the comprehension questions. The average ORF score for these few pupils was 65 cwpm.

As is mentioned above, there was a strong relationship between pupil performance on this subtask and the non-word decoding subtask, meaning that pupils who performed well or poorly on one tended to perform similarly on the other.

On the English EGRA, 46.1% of these pupils scored zero on the oral passage reading subtask (not shown), compared with 67.5% for Ewe.

Reading Comprehension

As can be seen in **Table 1**, a large majority of pupils (78.3%) were unable to answer a single reading comprehension question correctly in Ewe. The average number of questions attempted was 1.1 (out of a total of 5), and the average score was 15.4% correct of questions attempted. When the pupils scoring zero on this subtask were removed from the analysis, the average score was 70.7% correct out of items attempted. This reflects the lack of fluency with which these pupils were reading. For this subtask, pupils were asked only the questions that corresponded to the amount of the text that they had read. In other words, few pupils were able to read far enough into the passage before the time limit was reached to be asked more than the first comprehension question. In the case of Ewe, this meant 7 or more words in one minute.

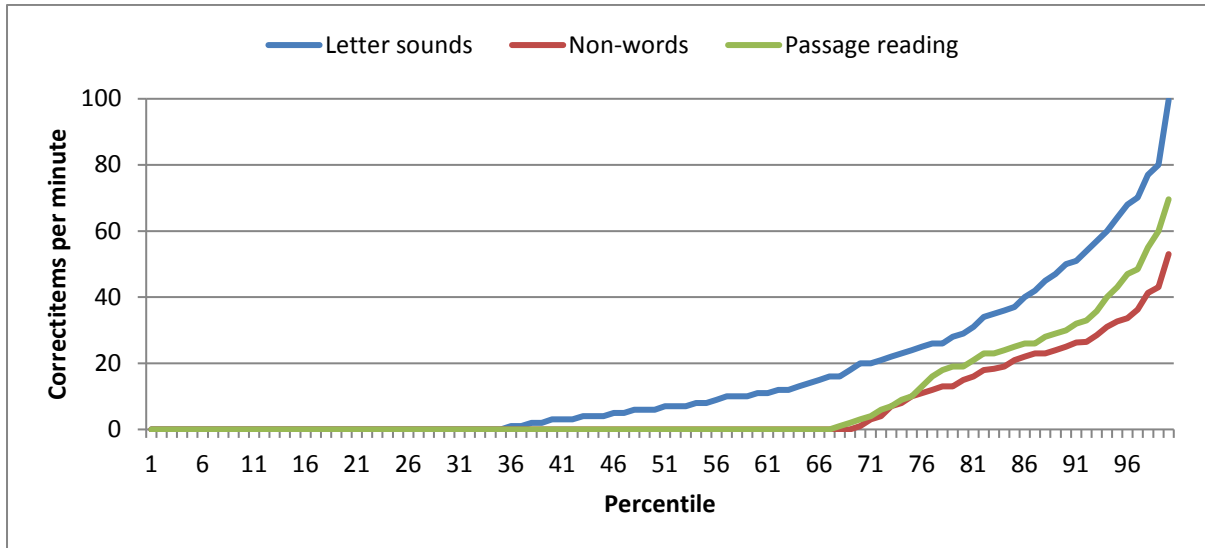
On the English EGRA, 78.6% of these pupils were not able to answer a single reading comprehension question correctly (not shown).

Correct Items per Minute, by Percentile

Finally, **Figure 2** presents the percentile distribution for the three timed subtasks of the Ewe EGRA. It shows the corresponding number of correct items per minute for each percentile, and illustrates the relationships among the skills measured by these three subtasks. For example, at about the 80th percentile, on average, pupils were achieving 29 correct letter sounds per minute, 19 correct words per minute on the passage reading subtask, and 15

correct non-words per minute. *Figure 2* further illustrates that letter sound knowledge precedes the ability to decode, and fluency rates of all three skills are related and increase together.

Figure 2: Percentile distribution on all timed subtasks, Ewe

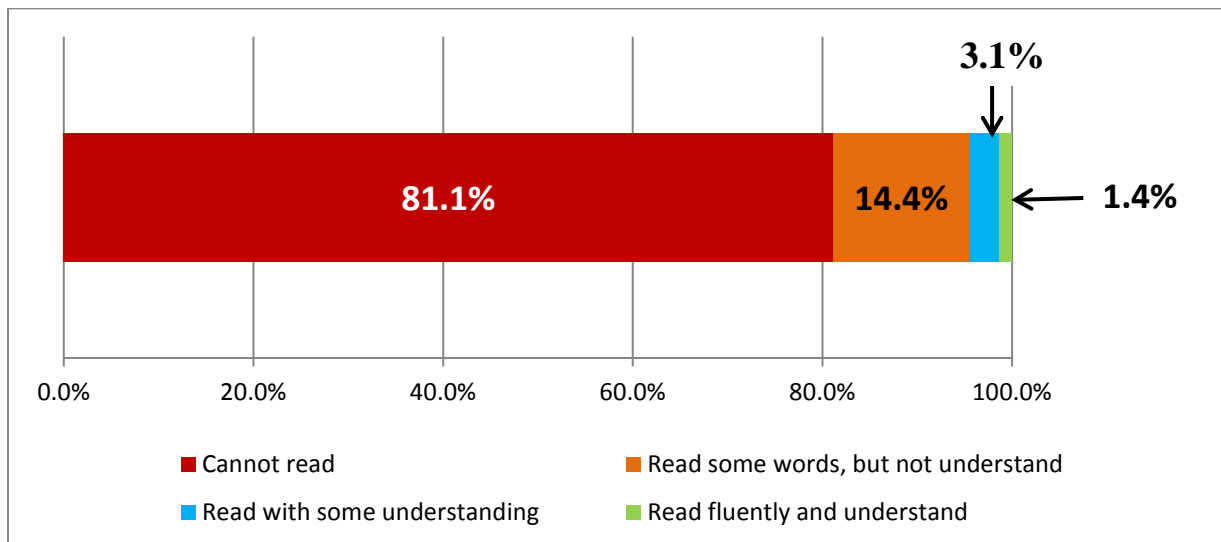


How Well Are Children Reading in Fante?

Overview of Results

The EGRA was administered to 692 pupils in schools where Fante was the designated language of instruction. Based on the results of the oral passage reading and reading comprehension subtasks, the state of reading in Fante can be summarised as shown in *Figure 1*:

Figure 1: Distribution of pupils by performance level,⁵⁵ Fante



- Most pupils (81.1%, $n = 570$) were unable to read a single word of the story.
- Some pupils (14.4%, $n = 97$) read 13 correct words per minute, indicating they were just beginning to understand the alphabetic principle (or the relationship between sounds and letters). Not surprisingly, these pupils answered only 5% of the passage questions correctly. These pupils could read some words, but were not yet at a point of being able to understand what they read.
- A small group of pupils (3.1%, $n = 19$) was transitioning from word-by-word identification to increased fluency. On average, these pupils read 32 correct words per minute and answered 43% of the passage questions correctly.
- An even smaller group (1.4%, $n = 6$) had sufficient fluency (automatic and accurate word identification) to focus on comprehension. On average, these pupils read 66 words per minute and answered 82% of the passage questions correctly.

⁵⁵ The four categories are defined as follows:

- **Cannot read:** oral reading fluency (ORF) score is zero
- **Read some words, but not understand:** ORF score is greater than zero and reading comprehension score is below 60% correct of those attempted
- **Read with some understanding:** reading comprehension score is 60% of those attempted
- **Read fluently and understand:** reading comprehension score is 80% correct of total

Results by Subtask

Table 1: Average EGRA scores in Fante

EGRA subtask	Percentage of pupils who scored zero	Average % correct of items attempted	Average fluency score (all pupils)	Average % correct of items attempted (excluding pupils with zero scores)	Average score (excluding pupils with zero scores)
Listening comprehension	9.0%	61.5%	—	67.6%	—
Letter sound knowledge	32.3%	36.9%	14.6 correct letter sounds per minute	54.4%	21.5 correct letter sounds per minute
Non-word decoding	76.3%	11.2%	3.2 correct non-words per minute	47.3%	13.3 correct non-words per minute
Oral passage reading	81.1%	9.7%	3.8 correct words per minute	51.2%	19.9 correct words per minute
Reading comprehension	92.7% ⁵⁶	4.9% ⁵⁷	—	66.3%	—

Listening Comprehension

This subtask measures an important pre-reading skill—the pupils’ ability to listen to and understand oral language. Pupils listened to a short story that was read to them in Fante, and were then asked three questions about the story. A small group of pupils (9.0%) scored zero (*Table 1*)—they were unable to answer a single question correctly. The overall average score for all pupils was 61.5%. The overall average score for the pupils who did not score zero on the subtask (i.e., 91.0% of the students) was 67.6%. The data suggest that most pupils were able to understand a story told to them in a familiar language.

Interestingly, but not surprisingly, the analysis showed that pupils who reported speaking a language at home other than Fante were almost twice as likely⁵⁸ to score zero on the listening comprehension subtask as pupils who reported speaking Fante at home.

The performance of the pupils on this subtask in Fante was very different from their performance in English. After listening to a story in English being read to them, 77% of the pupils were unable to answer a single question about the story correctly. This is more than eight times the number for Fante. If these pupils were not regularly communicating in

⁵⁶ This figure includes pupils who were not asked any comprehension questions because they could not read the story passage.

⁵⁷ Of the total number of items in the reading comprehension subtask (five), the average percentage correct was 3.1%.

⁵⁸ Odds ratio = 1.9

English, it is not surprising that they demonstrated greater oral language comprehension in Fante.

Letter Sound Knowledge

The letter sound knowledge subtask assesses a pupil's ability to produce the sounds of the letters of the alphabet naturally, without hesitation. If children struggle to produce letter sounds, they are unlikely to be able to decode words and read fluently. One third (32.3%) of the pupils were unable to identify the sound of a single letter correctly. The average correct letter sound score was 36.9% out of items attempted at a fluency of 14.6 correct letter sounds per minute (clspm). When pupils scoring zero were removed from the analysis, the average correct letter sound score was 54.5% out of items attempted at a fluency of 21.5 clspm. The pupils who could produce the sound of at least one letter correctly took, on average, 2.8 seconds per letter to produce the sound. This finding suggests that letter sound production was not yet fluent for most of these pupils. Instead, they were having to spend time thinking about each letter. Since letter sound production is important for identifying words (i.e., decoding), and automatic decoding facilitates reading comprehension, their low scores on non-words, passage reading, and comprehension are understandable (**Figure 1**).

Item analysis showed that pupils experienced more difficulty with some letters compared to others. In Fante, pupils had more difficulty with these letters (in both upper- and lower-case): **E, O, E, W, I, and Y**.

When these pupils were assessed with the English EGRA, 35.1% scored zero on the letter sounds subtask (not shown).

Non-word Decoding

For the non-word decoding subtask, pupils not only must know the sounds of individual letters, but also must be able to blend one sound with the next to correctly decode and say an unfamiliar word. Three-quarters of pupils (76.3%) were unable to decode non-words in Fante. This is not surprising given the performance on the letter sound knowledge subtask. The average score on the non-word decoding subtask was 11.2% correct out of items attempted at a fluency of 3.2 correct non-words per minute. When pupils scoring zero were removed from the analysis, the average score on the non-word decoding subtask was 47.3% correct out of items attempted at a fluency of 13.3 correct non-words per minute, indicating that these pupils were just beginning to understand and apply the relationship between sounds and letters.

Performance on the non-word decoding subtask was strongly correlated with performance on the letter sound knowledge subtask, as well as with the oral passage reading subtask (discussed in the next section).⁵⁹

Among the pupils who completed the Fante EGRA, the percentage who scored zero on the non-word decoding subtask was similar for the English EGRA (75.2%; not shown).

⁵⁹ Pearson correlation = 0.622 and 0.784, respectively.

Oral Passage Reading

As is depicted in **Figure 1** above, the majority of pupils (81.1%) scored zero on the oral passage reading subtask. The average score was 9.7% correct out of items attempted at a fluency of 3.8 correct words per minute (cwpm). Like the non-word reading results, this indicates that these pupils were just learning to decode words. When the pupils scoring zero on this subtask were removed from the analysis, the average score was 51.2% correct out of items attempted at a fluency of 19.9 cwpm. This means that pupils who could read at least one word correctly took, on average, 3.0 seconds to read each word.

A small group of pupils (3.1%) scored at least 60% on the reading comprehension subtask of the questions they attempted to answer. The average oral reading fluency (ORF) score for these pupils was 32 cwpm. This suggests that pupils who were reading 30 cwpm or more were shifting from word-by-word identification to increased fluency.

Pupils classified in **Figure 1** as “reading with comprehension” (1.4% of the pupils) scored at least 80% overall on the reading comprehension subtask, meaning that they correctly answered 4 or all 5 of the comprehension questions. The average ORF score for these few pupils was 66 cwpm.

As is mentioned above, there was a strong relationship between pupil performance on this subtask and the non-word decoding subtask, meaning that pupils who performed well or poorly on one tended to perform similarly on the other.

On the English EGRA, 42.4% of these pupils scored zero on the oral passage reading subtask (not shown) compared with 81.1% for Fante.

Reading Comprehension

As can be seen in **Table 1**, a large majority of pupils (92.7%) were unable to answer a single reading comprehension question correctly in Fante. The average number of questions attempted was less than 1 (0.5 out of a total of 5), and the average score was 4.9% correct of questions attempted. When the pupils scoring zero on this subtask were removed from the analysis, the average score was 66.3% correct out of items attempted. This reflects the lack of fluency with which these pupils were reading. For this subtask, pupils were asked only the questions that corresponded to the amount of the text that they had read. In other words, few pupils were able to read far enough into the passage before the time limit was reached to be asked more than the first comprehension question. In the case of Fante, this meant 6 or more words in one minute.

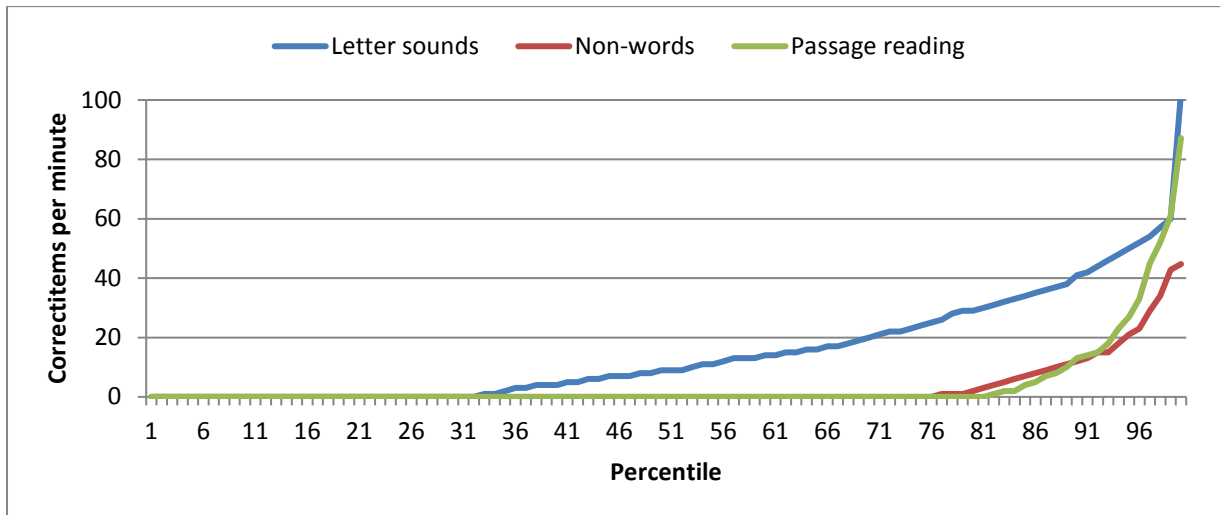
On the English EGRA, 90.1% of these pupils were not able to answer a single reading comprehension question correctly (not shown).

Correct Items per Minute, by Percentile

Finally, **Figure 2** presents the percentile distribution for the three timed subtasks of the Fante EGRA. It shows the corresponding number of correct items per minute for each percentile, and illustrates the relationships among the skills measured by these three subtasks. For example, at about the 80th percentile, on average, pupils were achieving 29 correct letter sounds per minute, 0 correct words per minute on the passage reading subtask, and 2 correct

non-words per minute. *Figure 2* further illustrates that letter sound knowledge precedes the ability to decode, and fluency rates of all three skills are related and increase together.

Figure 2: Percentile distribution on all timed subtasks, Fante

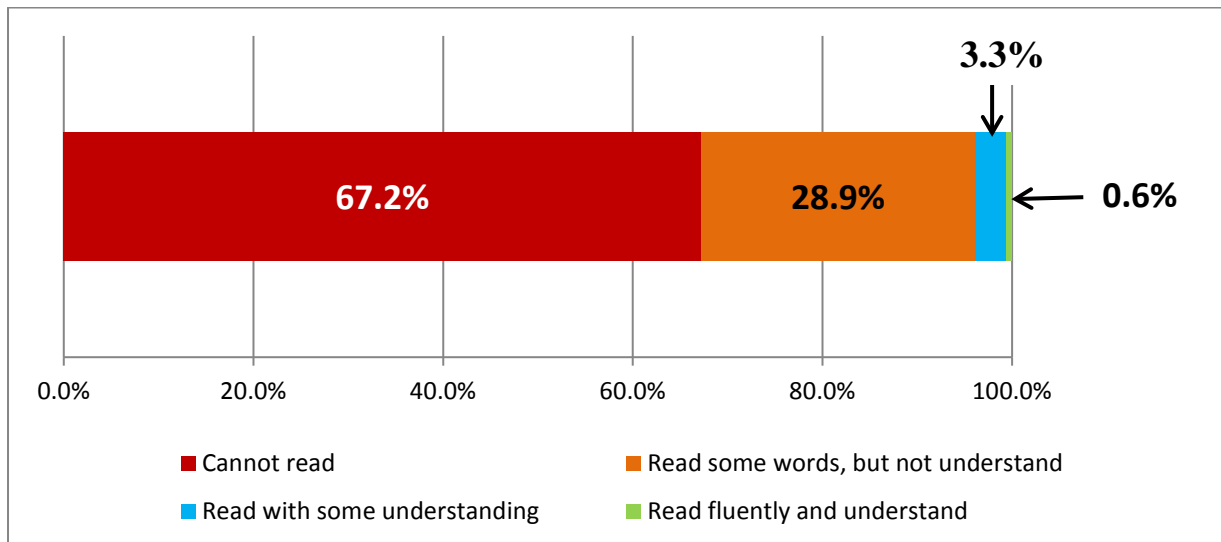


How Well Are Children Reading in Ga?

Overview of Results

The EGRA was administered to 430 pupils in schools where Ga was the designated language of instruction. Based on the results of the oral passage reading and reading comprehension subtasks, the state of reading in Ga can be summarized as shown in **Figure 1**:

Figure 1: Distribution of pupils by performance level,⁶⁰ Ga



- Most pupils (67.2%, $n = 227$) were unable to read a single word of the story.
- Some pupils (28.9%, $n = 135$) read 12 correct words per minute, indicating they were just beginning to understand the alphabetic principle (or the relationship between sounds and letters). Not surprisingly, these pupils answered only 3% of the passage questions correctly. These pupils could read some words, but were not yet at a point of being able to understand what they read.
- A small group of pupils (3.3%, $n = 15$) was transitioning from word-by-word identification to increased fluency. On average, these pupils read 41 correct words per minute and answered 47% of the passage questions correctly.
- An even smaller group (0.6%, $n = 3$) had sufficient fluency (automatic and accurate word identification) to focus on comprehension. On average, these pupils read 57 words per minute and answered 85% of the passage questions correctly.

⁶⁰ The four categories are defined as follows:

- **Cannot read:** oral reading fluency (ORF) score is zero
- **Read some words, but not understand:** ORF score is greater than zero and reading comprehension score is below 60% correct of those attempted
- **Read with some understanding:** reading comprehension score is 60% of those attempted
- **Read fluently and understand:** reading comprehension score is 80% correct of total

Results by Subtask

Table 1: Average EGRA scores in Ga

EGRA subtask	Percentage of pupils who scored zero	Average % correct of items attempted	Average fluency score (all pupils)	Average % correct of items attempted (excluding pupils with zero scores)	Average fluency score (excluding pupils with zero scores)
Listening comprehension	48.0%	31.4%	—	60.4%	—
Letter sound knowledge	33.1%	34.7%	13.0 correct letter sounds per minute	51.9%	19.5 correct letter sounds per minute
Non-word decoding	68.6%	15.7%	4.1 correct non-words per minute	49.9%	13.0 correct non-words per minute
Oral passage reading	67.2%	15.1%	5.3 correct words per minute	46.2%	16.1 correct words per minute
Reading comprehension	91.4% ⁶¹	5.0% ⁶²	—	57.4%	—

Listening Comprehension

This subtask measures an important pre-reading skill—the pupils’ ability to listen to and understand oral language. Pupils listened to a short story that was read to them in Ga, and were then asked three questions about the story. Half the pupils (48.0%) scored zero (*Table 1*)—they were unable to answer a single question correctly. The overall average score for all pupils was 31.4%. The overall average score for the pupils who did not score zero on the subtask (i.e., 52.0% of the students) was 60.4%. The data suggest that half the pupils were able to understand a story told to them in a familiar language.

Interestingly, but not surprisingly, the analysis showed that pupils who reported speaking a language at home other than Ga were more than 18 times as likely⁶³ to score zero on the listening comprehension subtask as pupils who reported speaking Ga at home.

The performance of the pupils on this subtask in Ga was very different from their performance in English. After listening to a story in English being read to them, 33% of the pupils were unable to answer a single question about the story correctly. This is smaller than

⁶¹ This figure includes pupils who were not asked any comprehension questions because they could not read the story passage.

⁶² Of the total number of items in the reading comprehension subtask (five), the average percentage correct was 3.0%.

⁶³ Odds ratio = 19.0

the number for Ga, which suggests that these pupils may have had opportunities to communicate in English.

Letter Sound Knowledge

The letter sound knowledge subtask assesses a pupil's ability to produce the sounds of the letters of the alphabet naturally, without hesitation. If children struggle to produce letter sounds, they are unlikely to be able to decode words and read fluently. One third (33.1%) of the pupils were unable to identify the sound of a single letter correctly. The average correct letter sound score was 34.7% out of items attempted at a fluency of 13.0 correct letter sounds per minute (clspm). When pupils scoring zero were removed from the analysis, the average correct letter sound score was 51.9% out of items attempted at a fluency of 19.5 clspm. The pupils who could produce the sound of at least one letter correctly took, on average, 3.1 seconds per letter to produce the sound. This finding suggests that letter sound production was not yet fluent for most of these pupils. Instead, they were having to spend time thinking about each letter. Since letter sound production is important for identifying words (i.e., decoding), and automatic decoding facilitates reading comprehension, their low scores on non-words, passage reading, and comprehension are understandable (**Figure 1**).

Item analysis showed that pupils experienced more difficulty with some letters compared to others. In Ga, pupils had more difficulty with these letters (in both upper- and lower-case): **E**, **O**, **E**, **N**, and **Y**.

When these pupils were assessed with the English EGRA, 34.4% scored zero on the letter sounds subtask.

Non-word Decoding

For the non-word decoding subtask, pupils not only must know the sounds of individual letters, but also must be able to blend one sound with the next to correctly decode and say an unfamiliar word. Two-thirds of pupils (68.6%) were unable to decode non-words in Ga. This is not surprising given the performance on the letter sound knowledge subtask. The average score on the non-word decoding subtask was 15.7% correct out of items attempted at a fluency of 4.1 correct non-words per minute. When pupils scoring zero were removed from the analysis, the average score on the non-word decoding subtask was 49.9% correct out of items attempted at a fluency of 13.0 correct non-words per minute, indicating that pupils were just beginning to understand and apply the relationship between sounds and letters.

Performance on the non-word decoding subtask was strongly correlated with performance on the letter sound knowledge subtask, as well as with the oral passage reading subtask (discussed in the next section).⁶⁴

Slightly fewer of the pupils who completed the Ga EGRA scored zero on the non-word decoding subtask of the English EGRA (59.5%; not shown).

⁶⁴ Pearson correlation = 0.660 and 0.769, respectively.

Oral Passage Reading

As is depicted in **Figure 1** above, the majority of pupils (67.2%) scored zero on the oral passage reading subtask. The average score was 15.1% correct out of items attempted at a fluency of 5.3 correct words per minute (cwpm). Like the non-word reading results, this indicates that these pupils were just learning to decode words. When the pupils scoring zero on this subtask were removed from the analysis, the average score was 46.2% correct out of items attempted at a fluency of 16.1 cwpm. This means that pupils who could read at least one word correctly took, on average, 3.7 seconds to read each word.

A small group of pupils (3.3%) scored at least 60% on the reading comprehension subtask of the questions they attempted to answer. The average oral reading fluency (ORF) score for these pupils was 41 cwpm. This suggests that pupils who were reading 40 cwpm or more were shifting from word-by-word identification to increased fluency.

Pupils classified in **Figure 1** as “reading with comprehension” (0.6% of the pupils) scored at least 80% overall on the reading comprehension subtask, meaning that they correctly answered 4 or all 5 of the comprehension questions. The average ORF score for these few pupils was 57 cwpm.

As is mentioned above, there was a strong relationship between pupil performance on this subtask and the non-word decoding subtask, meaning that pupils who performed well or poorly on one tended to perform similarly on the other.

On the English EGRA, 24.7% of these pupils scored zero on the oral passage reading subtask (not shown) compared with 67.2% for Ga.

Reading Comprehension

As can be seen in **Table 1**, a large majority of pupils (91.4%) were unable to answer a single reading comprehension question correctly in Ga. The average number of questions *attempted* was less than 1 (0.8 out of a total of 5), and the average score was 5.0% correct of questions attempted. When the pupils scoring zero on this subtask were removed from the analysis, the average score was 57.4% correct out of items attempted. This reflects the lack of fluency with which these pupils were reading. For this subtask, pupils were asked only the questions that corresponded to the amount of the text that they had read. In other words, few pupils were able to read far enough into the passage before the time limit was reached to be asked more than the first comprehension question. In the case of Ga, this meant 9 or more words in one minute.

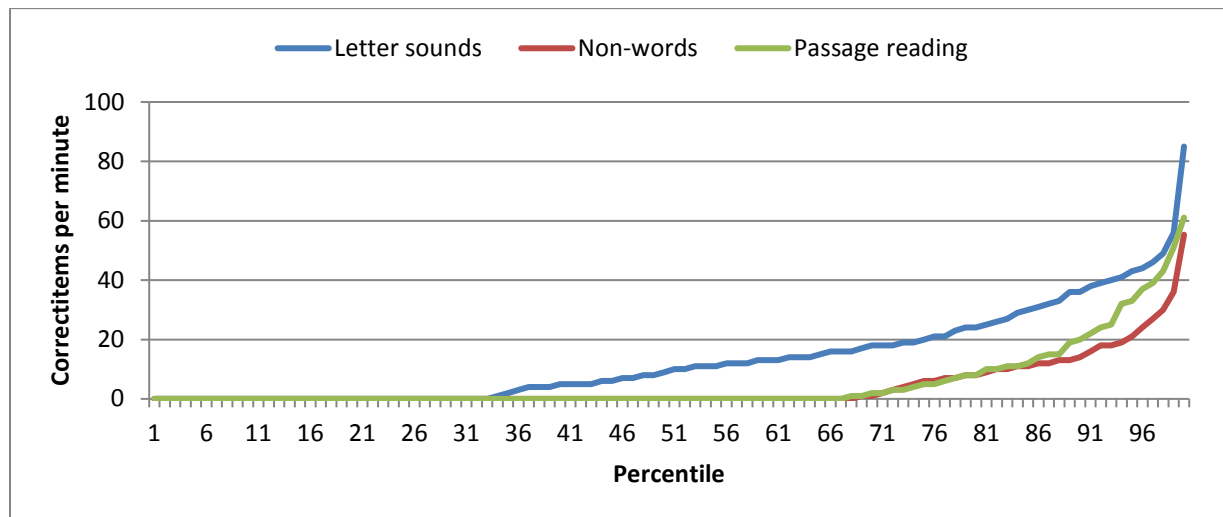
On the English EGRA, 59.5% of these pupils were not able to answer a single reading comprehension question correctly (not shown).

Correct Items per Minute, by Percentile

Finally, **Figure 2** presents the percentile distribution for the three timed subtasks of the Ga EGRA. It shows the corresponding number of correct items per minute for each percentile, and illustrates the relationships among the skills measured by these three subtasks. For example, at about the 80th percentile, on average, pupils were achieving 24 correct letter sounds per minute, 8 correct words per minute on the passage reading subtask, and 8 correct

non-words per minute. **Figure 2** further illustrates that letter sound knowledge precedes the ability to decode, and fluency rates of all three skills are related and increase together.

Figure 2: Percentile distribution on all timed subtasks, Ga

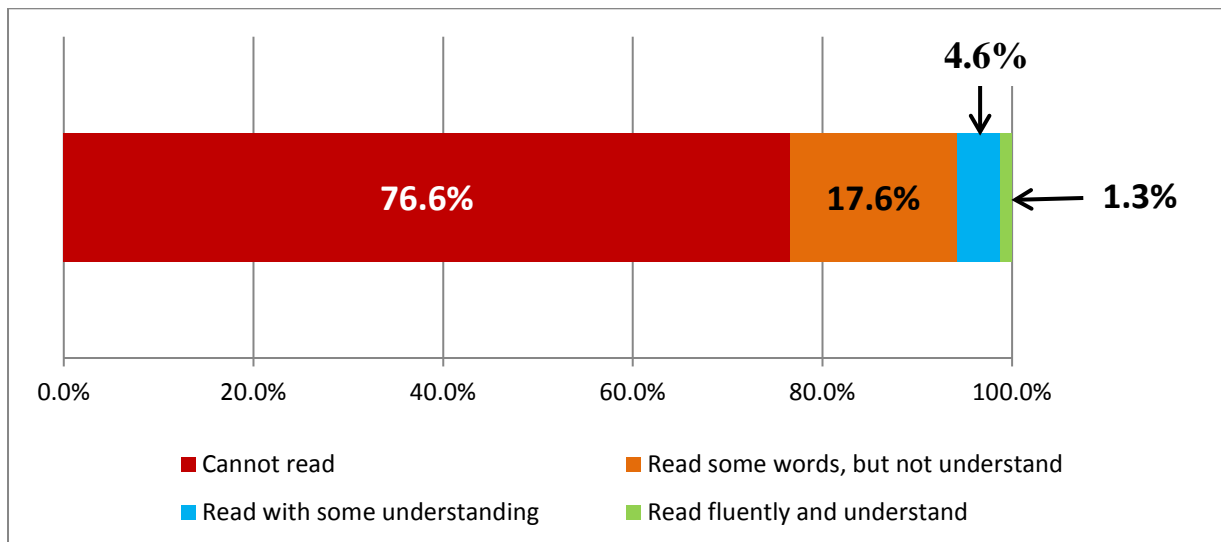


How Well Are Children Reading in Gonja?

Overview of Results

The EGRA was administered to 424 pupils in schools where Gonja was the designated language of instruction. Based on the results of the oral passage reading and reading comprehension subtasks, the state of reading in Gonja can be summarised as shown in *Figure 1*:

Figure 1: Distribution of pupils by performance level,⁶⁵ Gonja



- Most pupils (76.6%, $n = 335$) were unable to read a single word of the story.
- Some pupils (17.6%, $n = 67$) read 15 correct words per minute, indicating they were just beginning to understand the alphabetic principle (or the relationship between sounds and letters). Not surprisingly, these pupils answered only 6% of the passage questions correctly. These pupils could read some words, but were not yet at a point of being able to understand what they read.
- A small group of pupils (4.6%, $n = 16$) was transitioning from word-by-word identification to increased fluency. On average, these pupils read 26 correct words per minute and answered 42% of the passage questions correctly.
- An even smaller group (1.3%, $n = 5$) had sufficient fluency (automatic and accurate word identification) to focus on comprehension. On average, these pupils read 63 words per minute and answered 92% of the passage questions correctly.

⁶⁵ The four categories are defined as follows:

- **Cannot read:** oral reading fluency (ORF) score is zero
- **Read some words, but not understand:** ORF score is greater than zero and reading comprehension score is below 60% correct of those attempted
- **Read with some understanding:** reading comprehension score is 60% of those attempted
- **Read fluently and understand:** reading comprehension score is 80% correct of total

Results by Subtask

Table 1: Average EGRA scores in Gonja

EGRA subtask	Percentage of pupils who scored zero	Average % correct of items attempted	Average fluency score (all pupils)	Average % correct of items attempted (excluding pupils with zero scores)	Average fluency score (excluding pupils with zero scores)
Listening comprehension	37.2%	43.0%		68.5%	
Letter sound knowledge	52.8%	26.6%	9.3 correct letter sounds per minute	56.4%	19.8 correct letter sounds per minute
Non-word decoding	76.8%	11.9%	5.2 correct non-words per minute	51.5%	11.1 correct non-words per minute
Oral passage reading	76.6%	14.7%	7.6 correct words per minute	63.0%	19.8 correct words per minute
Reading comprehension	89.9% ⁶⁶	7.3% ⁶⁷		72.0%	

Listening Comprehension

This subtask measures an important pre-reading skill—the pupils’ ability to listen to and understand oral language. Pupils listened to a short story that was read to them in Gonja, and were then asked three questions about the story. One third of the pupils (37.2%) scored zero (*Table 1*)—they were unable to answer a single question correctly. The overall average score for all pupils was 43.0%. The overall average score for the pupils who did not score zero on the subtask (i.e., 62.8% of the students) was 68.5%. The data suggest that most pupils were able to understand a story told to them in a familiar language.

Interestingly, but not surprisingly, the analysis showed that pupils who reported speaking a language at home other than Gonja were more than 17 times as likely⁶⁸ to score zero on this subtask as pupils who reported speaking Gonja at home.

The performance of the pupils on this subtask in Gonja was very different from their performance in English. After listening to a story in English being read to them, 80% of the pupils were unable to answer a single question about the story correctly. This is more than

⁶⁶ This figure includes pupils who were not asked any comprehension questions because they could not read the story passage.

⁶⁷ Of the total number of items in the reading comprehension subtask (five), the average percentage correct was 4.1%.

⁶⁸ Odds ratio = 17.9

double the number for Gonja. If these pupils were not regularly communicating in English, it is not surprising that they demonstrated greater oral language comprehension in Gonja.

Letter Sound Knowledge

The letter sound knowledge subtask assesses a pupil's ability to produce the sounds of the letters of the alphabet naturally, without hesitation. If children struggle to produce letter sounds, they are unlikely to be able to decode words and read fluently. Half (52.8%) of the pupils were unable to identify the sound of a single letter correctly. The average correct letter sound score was 26.6% out of items attempted at a fluency of 9.3 correct letter sounds per minute (clspm). When pupils scoring zero were removed from the analysis, the average correct letter sound score was 56.4% out of items attempted at a fluency of 19.8 clspm. The pupils who could produce the sound of at least one letter correctly took, on average, 3.0 seconds per letter to produce the sound. This finding suggests that letter sound production was not yet fluent for most of these pupils. Instead, they were having to spend time thinking about each letter. Since letter sound production is important for identifying words (i.e., decoding), and automatic decoding facilitates reading comprehension, their low scores on non-words, passage reading, and comprehension are understandable (*Figure 1*).

Item analysis showed that pupils experienced more difficulty with some letters compared to others. In Gonja, pupils had more difficulty with these letters (in both upper- and lower-case): **E, N, F, Ɔ, and ŋ**.

When these pupils were assessed with the English EGRA, 56.0% scored zero on the letter sounds subtask (not shown).

Non-word Decoding

For the non-word decoding subtask, pupils not only must know the sounds of individual letters, but also must be able to blend one sound with the next to correctly decode and say an unfamiliar word. Three-quarters of pupils (76.8%) were unable to decode non-words in Gonja. This is not surprising given the performance on the letter sound knowledge subtask. The average score on the non-word decoding subtask was 11.9% correct out of items attempted at a fluency of 5.2 correct non-words per minute. When pupils scoring zero were removed from the analysis, the average score on the non-word decoding subtask was 51.5% correct out of items attempted at a fluency of 11.1 correct non-words per minute, indicating that pupils were just beginning to understand and apply the relationship between sounds and letters.

Performance on the non-word decoding subtask was strongly correlated with performance on the letter sound knowledge subtask, as well as with the oral passage reading subtask (discussed in the next section).⁶⁹

About the same number of pupils who completed the Gonja EGRA scored zero on the non-word decoding subtask of the English EGRA (77.4%; not shown).

Oral Passage Reading

⁶⁹ Pearson correlation = 0.731 and 0.860, respectively.

As is depicted in **Figure 1** above, the majority of pupils (76.6%) scored zero on the oral passage reading subtask. The average score was 14.7% correct out of items attempted at a fluency of 7.6 correct words per minute (cwpm). Like the non-word reading results, this indicates that these pupils were just learning to decode words. When the pupils scoring zero on this subtask were removed from the analysis, the average score was 63.0% correct out of items attempted at a fluency of 19.8 cwpm. This means that pupils who could read at least one word correctly took, on average, 3.0 seconds to read each word.

A small group of pupils (4.6%) scored at least 60% on the reading comprehension subtask of the questions they attempted to answer. The average oral reading fluency (ORF) score for these pupils was 26 cwpm. This suggests that pupils who were reading 25 cwpm or more were shifting from word-by-word identification to increased fluency.

Pupils classified in **Figure 1** as “reading with comprehension” (1.3% of the pupils) scored at least 80% overall on the reading comprehension subtask, meaning that they correctly answered 4 or all 5 of the comprehension questions. The average ORF score for these few pupils was 63 cwpm.

As is mentioned above, there was a strong relationship between pupil performance on this subtask and the non-word decoding subtask, meaning that pupils who performed well or poorly on one tended to perform similarly on the other.

On the English EGRA, 58.7% of these pupils scored zero on the oral passage reading subtask (not shown), compared with 76.6% for Gonja.

Reading Comprehension

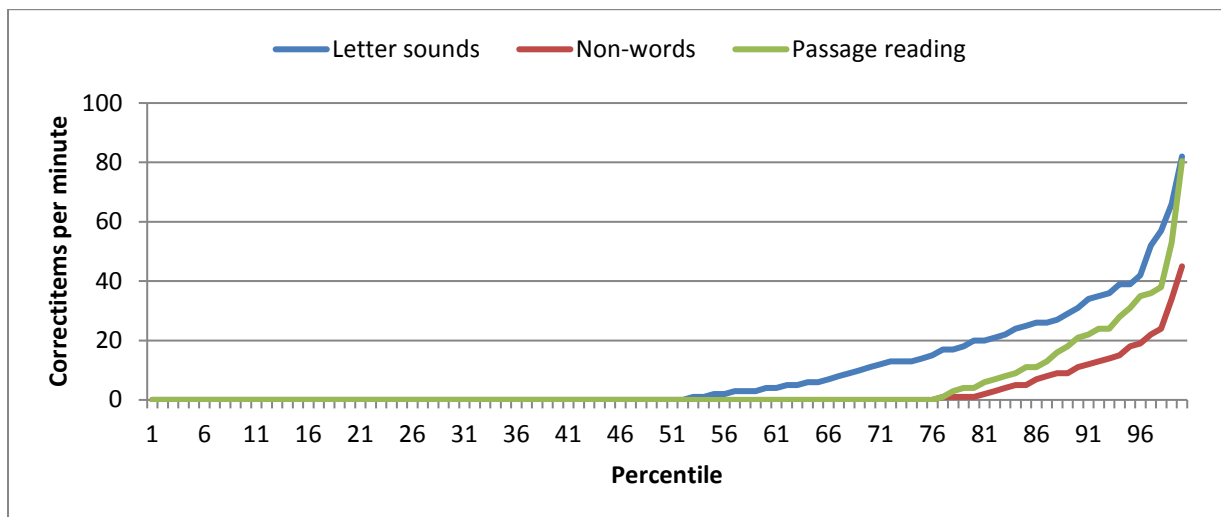
As can be seen in **Table 1**, a large majority of pupils (89.9%) were unable to answer a single reading comprehension question correctly in Gonja. The average number of questions attempted was less than 1 (0.5 out of a total of 5), and the average score was 7.3% correct of questions attempted. When the pupils scoring zero on this subtask were removed from the analysis, the average score was 72.0% correct out of items attempted. This reflects the lack of fluency with which these pupils were reading. For this subtask, pupils were asked only the questions that corresponded to the amount of the text that they had read. In other words, few pupils were able to read far enough into the passage before the time limit was reached to be asked more than the first comprehension question. In the case of Gonja, this meant 13 or more words in one minute.

On the English EGRA, 94.0% of these pupils were not able to answer a single reading comprehension question correctly (not shown).

Correct Items per Minute, by Percentile

Finally, **Figure 2** presents the percentile distribution for the three timed subtasks of the Gonja EGRA. It shows the corresponding number of correct items per minute for each percentile, and illustrates the relationships among the skills measured by these three subtasks. For example, at about the 80th percentile, on average, pupils were achieving 20 correct letter sounds per minute, 4 correct words per minute on the passage reading subtask, and 1 correct non-word per minute. **Figure 2** further illustrates that letter sound knowledge precedes the ability to decode, and fluency rates of all three skills are related and increase together.

Figure 2: Percentile distribution on all timed subtasks, Gonja

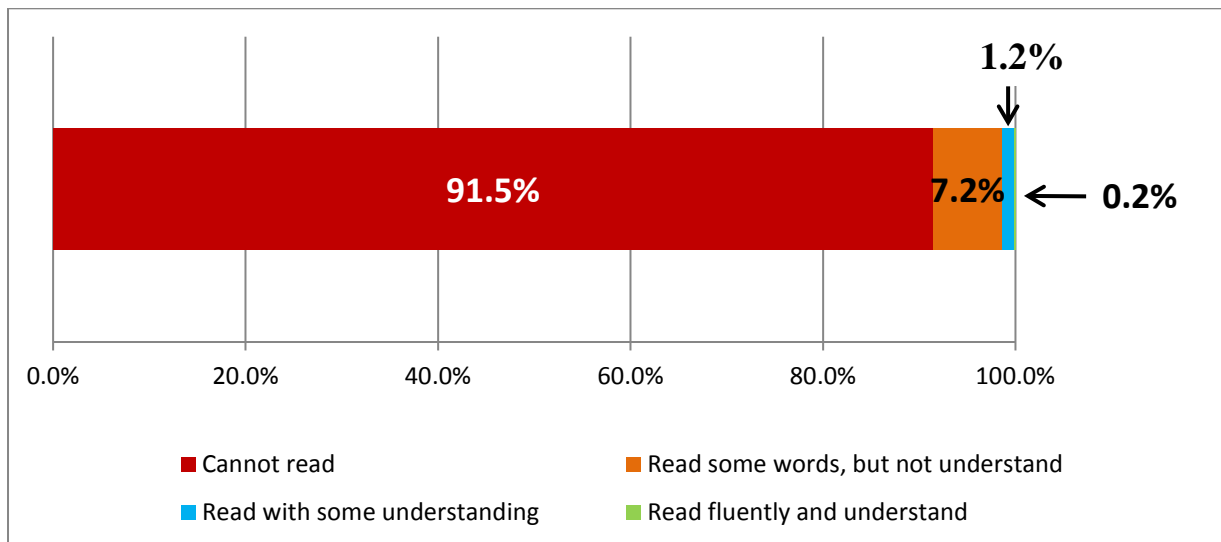


How Well Are Children Reading in Kasem?

Overview of Results

The EGRA was administered to 439 pupils in schools where Kasem was the designated language of instruction. Based on the results of the oral passage reading and reading comprehension subtasks, the state of reading in Kasem can be summarised as shown in *Figure 1*:

Figure 1: Distribution of pupils by performance level,⁷⁰ Kasem



- Most pupils (91.5%, $n = 399$) were unable to read a single word of the story.
- A small group of pupils (7.2%, $n = 35$) read 13 correct words per minute, indicating they were just beginning to understand the alphabetic principle (or the relationship between sounds and letters). Not surprisingly, these pupils answered only 9% of the passage questions correctly. These pupils could read some words, but were not yet at a point of being able to understand what they read.
- An even smaller group of pupils (1.2%, $n = 4$) was transitioning from word-by-word identification to increased fluency. On average, these pupils read 21 correct words per minute and answered 43% of the passage questions correctly.
- *One* pupil (0.2% of the sample) had sufficient fluency (automatic and accurate word identification) to focus on comprehension. This pupil read 122 words per minute and answered all of the passage questions correctly.

⁷⁰ The four categories are defined as follows:

- **Cannot read:** oral reading fluency (ORF) score is zero
- **Read some words, but not understand:** ORF score is greater than zero and reading comprehension score is below 60% correct of those attempted
- **Read with some understanding:** reading comprehension score is 60% of those attempted
- **Read fluently and understand:** reading comprehension score is 80% correct of total

Results by Subtask

Table 1: Average EGRA scores in Kasem

EGRA subtask	Percentage of pupils who scored zero	Average % correct of items attempted	Average fluency score (all pupils)	Average % correct of items attempted (excluding pupils with zero scores)	Average score (excluding pupils with zero scores)
Listening comprehension	38.4%	41.3%	—	67.1%	—
Letter sound knowledge	73.4%	6.1%	1.7 correct letter sounds per minute	22.9%	6.4 correct letter sounds per minute
Non-word decoding	95.4%	1.7%	0.5 correct non-words per minute	36.9%	10.0 correct non-words per minute
Oral passage reading	91.5%	3.6%	1.3 correct words per minute	42.1%	15.7 correct words per minute
Reading comprehension	95.4% ⁷¹	2.5% ⁷²	—	53.8%	—

Listening Comprehension

This subtask measures an important pre-reading skill—the pupils’ ability to listen to and understand oral language. Pupils listened to a short story that was read to them in Kasem, and were then asked three questions about the story. About one third of the pupils (38.4%) scored zero (*Table 1*)—they were unable to answer a single question correctly. The overall average score for all pupils was 41.3%. The overall average score for the pupils who did not score zero on the subtask (i.e., 61.6% of the students) was 67.1%. The data suggest that most pupils were able to understand a story told to them in a familiar language.

Interestingly, but not surprisingly, the analysis showed that pupils who reported speaking a language at home other than Kasem were more than 20 times as likely⁷³ to score zero on this subtask as pupils who reported speaking Kasem at home.

The performance of the pupils on this subtask in Kasem was very different from their performance in English. After listening to a story in English being read to them, 88% of the pupils were unable to answer a single question about the story correctly. This is more than

⁷¹ This figure includes pupils who were not asked any comprehension questions because they could not read the story passage.

⁷² Of the total number of items in the reading comprehension subtask (five), the average percentage correct was 1.3%.

⁷³ Odds ratio = 23.0

double the number for Kasem. If these pupils were not regularly communicating English, it is not surprising that pupils demonstrated greater oral language comprehension in Kasem.

Letter Sound Knowledge

The letter sound knowledge subtask assesses a pupil's ability to produce the sounds of the letters of the alphabet naturally, without hesitation. If children struggle to produce letter sounds, they are unlikely to be able to decode words and read fluently. Three quarters (73.4%) of the pupils were unable to identify the sound of a single letter correctly. The average correct letter sound score was 6.1% out of items attempted at a fluency of 1.7 correct letter sounds per minute (clspm). When pupils scoring zero were removed from the analysis, the average correct letter sound score was 22.9% out of items attempted at a fluency of 6.4 clspm. The pupils who could produce the sound of at least one letter correctly took, on average, 9.4 seconds per letter to produce the sound. This finding suggests that letter sound production was not yet fluent for most of these pupils. Instead, they were having to spend time thinking about each letter. Since letter sound production is important for identifying words (i.e., decoding), and automatic decoding facilitates reading comprehension, their low scores on non-words, passage reading, and comprehension are understandable (***Figure 1***).

When these pupils were assessed with the English EGRA, 84.0% scored zero on the letter sounds subtask (not shown).

Non-word Decoding

For the non-word decoding subtask, pupils not only must know the sounds of individual letters, but also must be able to blend one sound with the next to correctly decode and say an unfamiliar word. Most of these pupils (95.4%) were unable to decode non-words in Kasem. This is not surprising given the performance on the letter sound knowledge subtask. The average score on the non-word decoding subtask was 1.7% correct out of items attempted at a fluency of 0.5 correct non-words per minute. When pupils scoring zero were removed from the analysis, the average score on the non-word decoding subtask was 36.9% correct out of items attempted at a fluency of 10.0 correct non-words per minute, indicating that pupils were just beginning to understand and apply the relationship between sounds and letters.

Performance on the non-word decoding subtask was strongly correlated with performance on the letter sound knowledge subtask, as well as with the oral passage reading subtask (discussed in the next section).⁷⁴

Among the pupils who completed the Kasem EGRA, the percentage who scored zero on the non-word decoding subtask of the English EGRA (94.5%) was about the same (not shown).

Oral Passage Reading

As is depicted in ***Figure 1*** above, the majority of pupils (91.5%) scored zero on the oral passage reading subtask. The average score was 3.6% correct out of items attempted at a fluency of 1.3 correct words per minute (cwpm). Like the non-word reading results, this indicates that these pupils were just learning to decode words. When the pupils scoring zero on this subtask were removed from the analysis, the average score was 42.1% correct out of

⁷⁴ Pearson correlation = 0.609 and 0.864, respectively.

items attempted at a fluency of 15.7 cwpm. This means that pupils who could read at least one word correctly took, on average, 3.8 seconds to read each word.

A small group of pupils (1.2%) scored at least 60% on the reading comprehension subtask of the questions they attempted to answer. The average oral reading fluency (ORF) score for these pupils was 21 cwpm. This suggests that pupils who were reading 20 cwpm or more were shifting from word-by-word identification to increased fluency.

Only one pupil in the sample was classified as “reading with comprehension.” This pupil exceeded the criterion score of 80% overall on the reading comprehension subtask, and correctly answered all 5 of the comprehension questions. The ORF score for this pupil was 122 cwpm.

As is mentioned above, there was a strong relationship between pupil performance on this subtask and the non-word decoding subtask, meaning that pupils who performed well or poorly on one tended to perform similarly on the other.

On the English EGRA, 75.7% of these pupils scored zero on the oral passage reading subtask (not shown) compared with 91.5% for Kasem.

Reading Comprehension

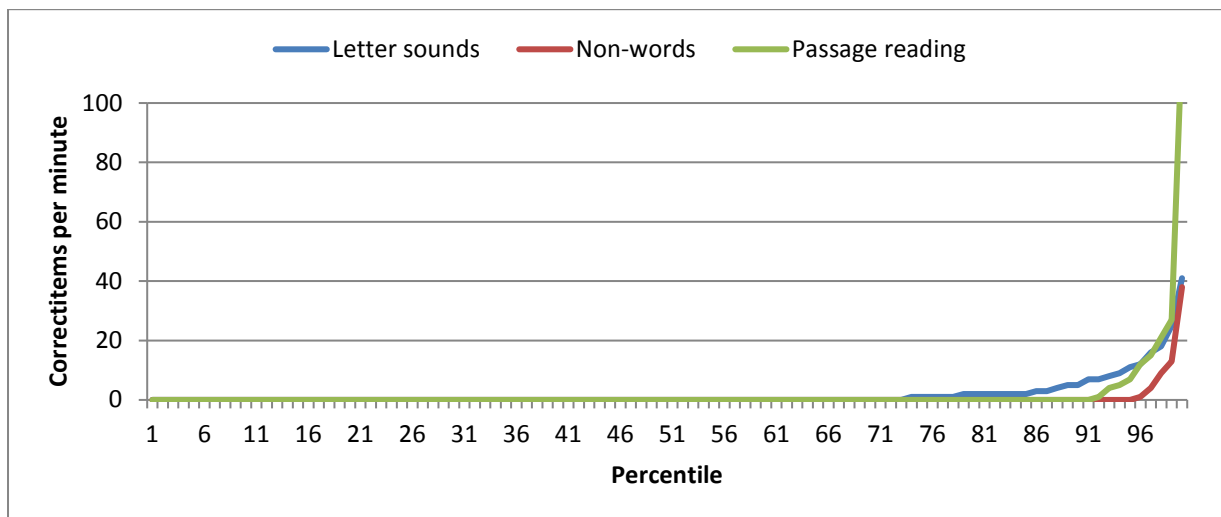
As can be seen in **Table 1**, a large majority of pupils (95.4%) were unable to answer a single reading comprehension question correctly in Kasem. The average number of questions attempted was less than 1 (0.2 out of a total of 5), and the average score was 2.5% correct of questions attempted. When the pupils scoring zero on this subtask were removed from the analysis, the average score was 53.8% correct out of items attempted. This reflects the lack of fluency with which these pupils were reading. For this subtask, pupils were asked only the questions that corresponded to the amount of the text that they had read. In other words, few pupils were able to read far enough into the passage before the time limit was reached to be asked more than the first comprehension question. In the case of Kasem, this meant 13 or more words in one minute.

On the English EGRA, 95.7% of these pupils were not able to answer a single reading comprehension question correctly (not shown).

Correct Items per Minute, by Percentile

Finally, **Figure 2** presents the percentile distribution for the three timed subtasks of the Kasem EGRA. It shows the corresponding number of correct items per minute for each percentile, and illustrates the relationships among the skills measured by these three subtasks. For example, at about the 90th percentile, on average, pupils were achieving 5 correct letter sounds per minute, 0 correct words per minute on the passage reading subtask, and 0 correct non-words per minute. Further, whereas pupils at the 95th percentile, on average, were achieving 11 correct letter sounds per minute, they could read 7 correct words on the passage reading subtask, and 0 correct non-words per minute. This graph further illustrates that letter sound knowledge precedes the ability to decode, and fluency rates of all three skills are related and increase together.

Figure 2: Percentile distribution on all timed subtasks, Kasem

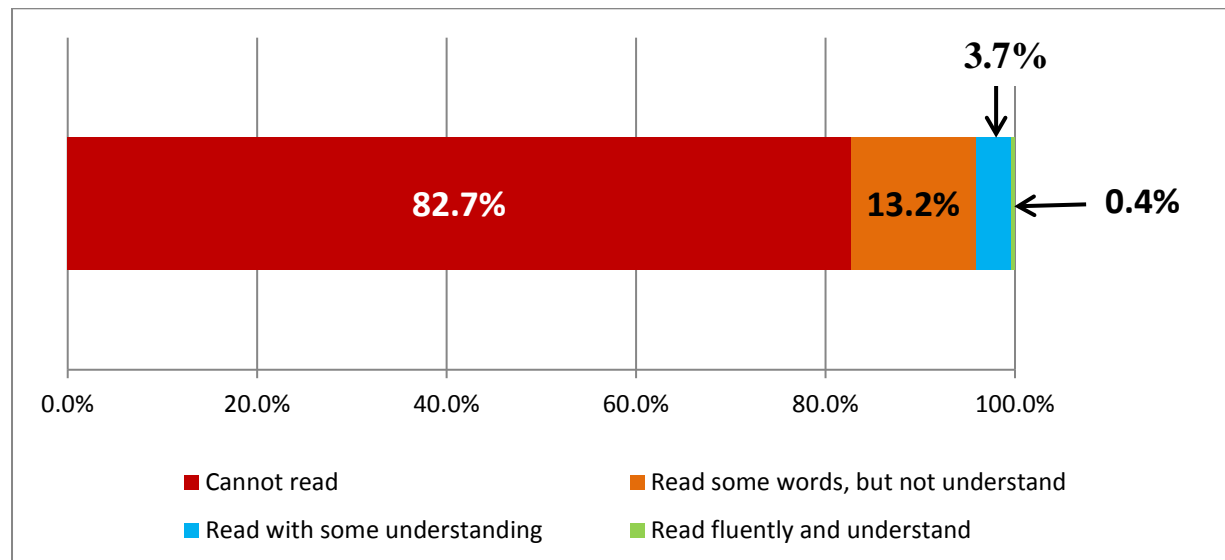


How Well Are Children Reading in Nzema?

Overview of Results

The EGRA was administered to 442 pupils in schools where Nzema was the designated language of instruction. Based on the results of the oral passage reading and reading comprehension subtasks, the state of reading in Nzema can be summarised as shown in *Figure 1*:

Figure 1: Distribution of pupils by performance level,⁷⁵ Nzema



- Most pupils (82.7%, $n = 371$) were unable to read a single word of the story.
- Some pupils (13.2%, $n = 54$) read 10 correct words per minute, indicating they were just beginning to understand the alphabetic principle (or the relationship between sounds and letters). Not surprisingly, these pupils answered only 3% of the passage questions correctly. These pupils could read some words, but were not yet at a point of being able to understand what they read.
- A small group of pupils (3.7%, $n = 15$) was transitioning from word-by-word identification to increased fluency. On average, these pupils read 25 correct words per minute and answered 35% of the passage questions correctly.
- *Two* pupils (0.4%) had sufficient fluency (automatic and accurate word identification) to focus on comprehension. On average, these two pupils read 64 words per minute and answered 96% of the passage questions correctly.

⁷⁵ The four categories are defined as follows:

- **Cannot read:** oral reading fluency (ORF) score is zero
- **Read some words, but not understand:** ORF score is greater than zero and reading comprehension score is below 60% correct of those attempted
- **Read with some understanding:** reading comprehension score is 60% of those attempted
- **Read fluently and understand:** reading comprehension score is 80% correct of total

Results by Subtask

Table 1: Average EGRA scores in Nzema

EGRA subtask	Percentage of pupils who scored zero	Average % correct of items attempted	Average fluency score (all pupils)	Average % correct of items attempted (excluding pupils with zero scores)	Average score(excluding pupils with zero scores)
Listening comprehension	5.2%	84.6%	—	89.2%	—
Letter sound knowledge	42.1%	32.8%	12.2 correct letter sounds per minute	56.6%	21.1 correct letter sounds per minute
Non-word decoding	71.4%	15.7%	4.3 correct non-words per minute	55.0%	15.2 correct non-words per minute
Oral passage reading	82.7%	9.1%	2.5 correct words per minute	52.4%	14.4 correct words per minute
Reading comprehension	94.1% ⁷⁶	4.8% ⁷⁷	—	89.2%	—

Listening Comprehension

This subtask measures an important pre-reading skill—the pupils’ ability to listen to and understand oral language. Pupils listened to a short story that was read to them in Nzema, and were then asked three questions about the story. Very few (5.2%) pupils scored zero (*Table 1*), meaning that they were unable to answer a single question correctly. The overall average score for all pupils was 84.6%. The overall average score for the pupils who did not score zero on the subtask (i.e., 94.8% of the students) was 89.2%. The data suggest that most pupils were able to understand a story told to them in a familiar language.

Interestingly, but not surprisingly, the analysis showed that pupils who reported speaking a language at home other than Nzema were more than six times as likely⁷⁸ to score zero on this subtask as pupils who reported speaking Nzema at home.

The performance of the pupils on this subtask in Nzema was very different from their performance in English. After listening to a story in English being read to them, 60% of the pupils were unable to answer a single question about the story correctly. This is more than 10

⁷⁶ This figure includes pupils who were not asked any comprehension questions because they could not read the story passage.

⁷⁷ Of the total number of items in the reading comprehension subtask (five), the average percentage correct was 2.0%.

⁷⁸ Odds ratio = 6.7

times the number for Nzema. If these pupils were not regularly communicating in English, it is not surprising that they demonstrated greater oral language comprehension in Nzema.

Letter Sound Knowledge

The letter sound knowledge subtask assesses a pupil's ability to produce the sounds of the letters of the alphabet naturally, without hesitation. If children struggle to produce letter sounds, they are unlikely to be able to decode words and read fluently. Many (42.1%) pupils were unable to identify the sound of a single letter correctly. The average correct letter sound score was 32.8% out of items attempted at a fluency of 12.2 correct letter sounds per minute (clspm). When pupils scoring zero were removed from the analysis, the average correct letter sound score was 56.6% out of items attempted at a fluency of 21.1 clspm. The pupils who could produce the sound of at least one letter correctly took, on average, 2.8 seconds per letter to produce the sound. This finding suggests that letter sound production was not yet fluent for most of these pupils. Instead, they were having to spend time thinking about each letter. Since letter sound production is important for identifying words (i.e., decoding), and automatic decoding facilitates reading comprehension, their low scores on non-words, passage reading, and comprehension are understandable (*Figure 1*).

Item analysis showed that pupils experienced more difficulty with some letters compared to others. In Nzema, pupils had more difficulty with these letters (in both upper- and lower-case): **O**, **N**, **G**, and **Y**.

When these pupils were assessed with the English EGRA, 45.5% scored zero on the letter sounds subtask (not shown).

Non-word Decoding

For the non-word decoding subtask, pupils not only must know the sounds of individual letters, but also must be able to blend one sound with the next to correctly decode and say an unfamiliar word. Almost three-quarters of pupils (71.4%) were unable to decode non-words in Nzema. This is not surprising given the performance on the letter sound knowledge subtask. The average score on the non-word decoding subtask was 15.7% correct out of items attempted at a fluency of 4.3 correct non-words per minute. When pupils scoring zero were removed from the analysis, the average score on the non-word decoding subtask was 55.0% correct out of items attempted at a fluency of 15.2 correct non-words per minute, indicating that pupils were just beginning to understand and apply the relationship between sounds and letters.

Performance on the non-word decoding subtask was strongly correlated with performance on the letter sound knowledge subtask, as well as with the oral passage reading subtask (discussed in the next section).⁷⁹

Slightly fewer of the pupils who completed the Nzema EGRA scored zero on the non-word decoding subtask of the English EGRA (71.7%; not shown).

⁷⁹ Pearson correlation = 0.724 and 0.823, respectively.

Oral Passage Reading

As is depicted in **Figure 1** above, the majority of pupils (82.7%) scored zero on the oral passage reading subtask. The average score was 9.1% correct out of items attempted at a fluency of 2.5 correct words per minute (cwpm). Like the non-word reading results, this indicates that these pupils were just learning to decode words. When the pupils scoring zero on this subtask were removed from the analysis, the average score was 52.4% correct out of items attempted at a fluency of 14.4 cwpm. This means that pupils who could read at least one word correctly took, on average, 4.2 seconds to read each word.

A small group of pupils (3.7%) scored at least 60% on the reading comprehension subtask of the questions they attempted to answer. The average oral reading fluency (ORF) score for these pupils was 25 cwpm. This suggests that pupils who were reading 25 cwpm or more were shifting from word-by-word identification to increased fluency.

Pupils classified in **Figure 1** as “reading with comprehension” (two pupils) scored at least 80% overall on the reading comprehension subtask, meaning that they correctly answered 4 or all 5 of the comprehension questions. The average ORF score for these two pupils was 64 cwpm.

As is mentioned above, there was a strong relationship between pupil performance on this subtask and the non-word decoding subtask, meaning that pupils who performed well or poorly on one tended to perform similarly on the other.

On the English EGRA, 45.5% of these pupils scored zero on the oral passage reading subtask (not shown) compared with 82.7% for Nzema.

Reading Comprehension

As can be seen in **Table 1**, a large majority of pupils (94.1%) were unable to answer a single reading comprehension question correctly in Nzema. The average number of questions attempted was less than 1 (0.3 out of a total of 5), and the average score was 4.8% correct of questions attempted. When the pupils scoring zero on this subtask were removed from the analysis, the average score was 89.2% correct out of items attempted. This reflects the lack of fluency with which these pupils were reading. For this subtask, pupils were asked only the questions that corresponded to the amount of the text that they had read. In other words, few pupils were able to read far enough into the passage before the time limit was reached to be asked more than the first comprehension question. In the case of Nzema, this meant 9 or more words in one minute.

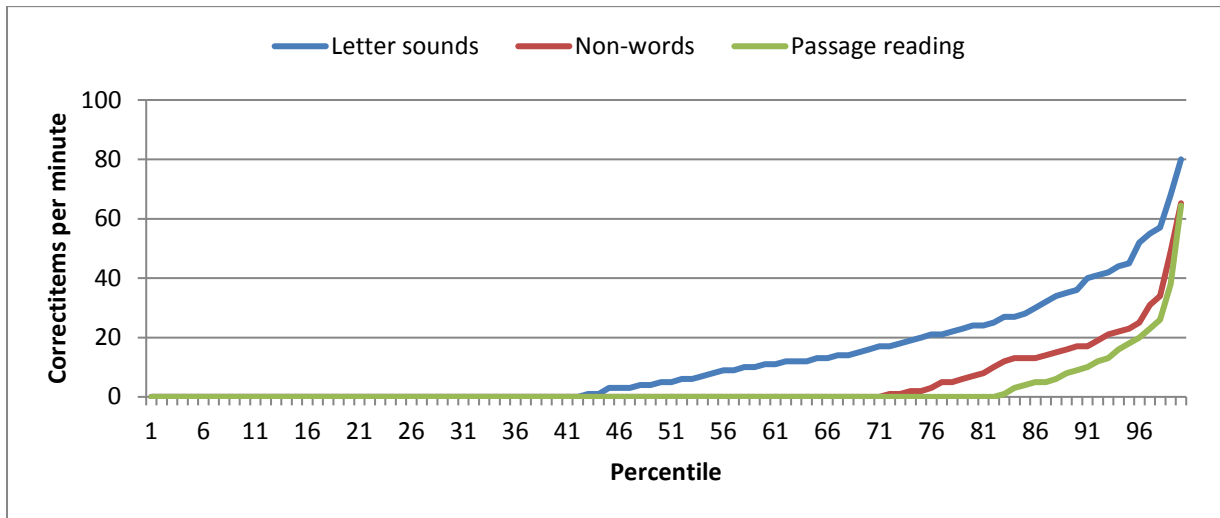
On the English EGRA, 92.0% of these pupils were not able to answer a single reading comprehension question correctly (not shown).

Correct Items per Minute, by Percentile

Finally, **Figure 2** presents the percentile distribution for the three timed subtasks of the Nzema EGRA. It shows the corresponding number of correct items per minute for each percentile, and illustrates the relationships among the skills measured by these three subtasks. For example, at about the 80th percentile, on average, pupils were achieving 24 correct letter sounds per minute, 0 correct words per minute on the passage reading subtask, and 7 correct

non-words per minute. *Figure 2* further illustrates that letter sound knowledge precedes the ability to decode, and fluency rates of all three skills are related and increase together.

Figure 2: Percentile distribution on all timed subtasks, Nzema

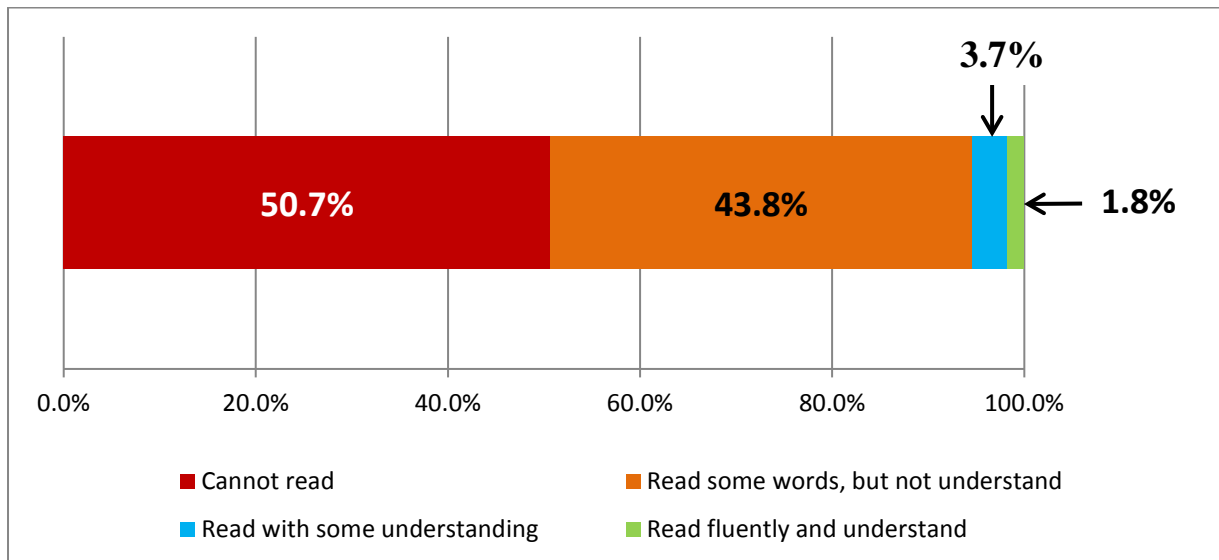


How Well Are Children Reading in English?

Overview of Results

The EGRA was administered nationally in English to 7,923 pupils in schools across Ghana. Based on the results of the oral passage reading and reading comprehension subtasks, the state of reading in English can be summarised as shown in *Figure 1*:

Figure 1: Distribution of pupils by performance level,⁸⁰ English



- Half of the pupils (50.7%, $n = 4,148$) in Ghana were unable to read a single word of the story.
- Many pupils (43.8%, $n = 3,344$) read 12 correct words per minute, indicating they were just beginning to understand the alphabetic principle (or the relationship between sounds and letters). Not surprisingly, these pupils answered only 6% of the passage questions correctly. These pupils could read some words, but were not yet at a point of being able to understand what they read.
- A small group of pupils (3.7%, $n = 287$) was transitioning from word-by-word identification to increased fluency. On average, these pupils read 28 correct words per minute and answered 46% of the passage questions correctly.
- An even smaller group (1.8%, $n = 136$) had sufficient fluency (automatic and accurate word identification) to focus on comprehension. On average, these pupils read 52 words per minute and answered 84% of the passage questions correctly.

⁸⁰ The four categories are defined as follows:

- **Cannot read:** oral reading fluency (ORF) score is zero
- **Read some words, but not understand:** ORF score is greater than zero and reading comprehension score is below 60% correct of those attempted
- **Read with some understanding:** reading comprehension score is 60% of those attempted
- **Read fluently and understand:** reading comprehension score is 80% correct of total

Results by Subtask

Table 1: Average EGRA scores in English

EGRA subtask	Percentage of pupils who scored zero	Average % correct of items attempted	Average score on timed subtasks (all pupils)	Average % correct of items attempted (excluding pupils with zero scores)	Average score on timed subtasks (excluding pupils with zero scores)
Listening comprehension	74.4%	13.7%	—	53.3%	—
Letter sound knowledge	54.9%	24.0%	9.4 correct letter sounds per minute	53.1%	20.8 correct letter sounds per minute
Non-word decoding	78.6%	11.1%	3.0 correct non-words per minute	51.7%	14.1 correct non-words per minute
Oral passage reading	50.7%	23.7%	9.2 correct words per minute	48.2%	18.6 correct words per minute
Reading comprehension	89.4% ⁸¹	6.3% ⁸²	—	59.4%	—

Listening Comprehension

This subtask measures an important pre-reading skill—the pupils’ ability to listen to and understand oral language. Pupils listened to a short story that was read to them in English, and were then asked three questions about the story. Three-quarters (74.4%) of pupils scored zero (*Table 1*), having been unable to answer a single question correctly. The overall average score for all pupils was 13.7%. The average score for the pupils who did not score zero on the subtask (i.e., 25.6% of the students) was 53.3%. The data suggest that English was not a familiar language for most of these pupils, as few were able to understand a story told to them in English. If these pupils were not regularly communicating in English, it is not surprising that they demonstrated weak oral language comprehension in English.

Letter Sound Knowledge

The letter sound knowledge subtask assesses a pupil’s ability to produce the sounds of the letters of the alphabet naturally, without hesitation. If children struggle to produce letter sounds, they are unlikely to be able to decode words and read fluently. About half (54.9%) of the pupils were unable to identify the sound of a single letter correctly. The average correct letter sound score was 24.0% out of items attempted at a fluency of 9.4 correct letter sounds

⁸¹ This figure includes pupils who were not asked any comprehension questions because they could not read the story passage.

⁸² Of the total number of items in the reading comprehension subtask (five), the average percentage correct was 4.7%.

per minute (clspm). When pupils scoring zero were removed from the analysis, the average correct letter sound score was 53.1% out of items attempted at a fluency of 20.8 clspm. The pupils who could produce the sound of at least one letter correctly took, on average, 2.9 seconds per letter to produce the sound. This finding suggests that letter sound production was not yet fluent for most of these pupils. Instead, they were having to spend time thinking about each letter. Since letter sound production is important for identifying words (i.e., decoding), and automatic decoding facilitates reading comprehension, their low scores on non-words, passage reading, and comprehension are understandable (*Figure 1*).

Item analysis showed that pupils experienced more difficulty with some letters compared to others. In English, pupils had more difficulty with these letters (in both upper- and lower-case): **A, E, I, C, R, and W**.

Non-word Decoding

For the non-word decoding subtask, pupils not only must know the sounds of individual letters, but also must be able to blend one sound with the next to correctly decode and say an unfamiliar word. Over three-quarters of pupils (78.6%) were unable to decode non-words in English. This is not surprising given the performance on the letter sound knowledge subtask. The overall average score on the non-word decoding subtask was 11.1% correct out of items attempted at a fluency of 3.0 correct non-words per minute. When pupils scoring zero were removed from the analysis, the overall average score on the non-word decoding subtask was 51.7% out of items attempted at a fluency of 14.1 correct non-words per minute, indicating that pupils were just beginning to understand and apply the relationship between sounds and letters.

Performance on the non-word decoding subtask was strongly correlated with performance on the letter sound knowledge subtask, as well as with the oral passage reading subtask (discussed in the next section).⁸³

Oral Passage Reading

As is depicted in *Figure 1* above, half the pupils (50.7%) scored zero on the oral passage reading subtask. The overall average score was 23.7% correct out of items attempted, at a fluency of 9.2 correct words per minute (cwpm). Like the non-word reading results, this indicates that these pupils were just learning to decode words. When the pupils scoring zero on this subtask were removed from the analysis, the average score was 48.2% correct out of items attempted at a fluency of 18.6 cwpm. This means that pupils who could read at least one word correctly took, on average, 3.2 seconds to read each word.

A small group of pupils (3.7%) scored at least 60% on the reading comprehension subtask of the questions they attempted to answer. The average oral reading fluency (ORF) score for these pupils was 28 cwpm. This suggests that pupils who were reading 25 cwpm or more were shifting from word-by-word identification to increased fluency.

Pupils classified in *Figure 1* as “reading with comprehension” (1.8% of the pupils) scored at least 80% overall on the reading comprehension subtask, meaning that they correctly

⁸³ Pearson correlation = 0.680 and 0.796, respectively.

answered 4 or all 5 of the comprehension questions. The average ORF score for these few pupils was 52 cwpm.

As is mentioned above, there was a strong relationship between pupil performance on this subtask and the non-word decoding subtask, meaning that pupils who performed well or poorly on one tended to perform similarly on the other.

Reading Comprehension

As can be seen in **Table 1**, a large majority of pupils (89.4%) were unable to answer a single reading comprehension question correctly in English. The average number of questions attempted was 1.0 (out of a total of 5), and the average score was 6.3% correct of questions attempted. When the pupils scoring zero on this subtask were removed from the analysis, the average score was 59.4% correct out of items attempted. This reflects the lack of fluency with which these pupils were reading and the weak comprehension of English. For this subtask, pupils were asked only the questions that corresponded to the amount of the text that they had read. In other words, few pupils were able to read far enough into the passage before the time limit was reached to be asked more than the first comprehension question. In the case of English, this meant 13 or more words in one minute.

Correct Items per Minute, by Percentile

Finally, **Figure 2** presents the percentile distribution for the three timed subtasks of the English EGRA. It shows the corresponding number of correct items per minute for each percentile, and illustrates the relationships among the skills measured by these three subtasks. For example, at about the 80th percentile, on average, pupils were achieving 20 correct letter sounds per minute, 13 correct words per minute on the passage reading subtask, and 2 correct non-word per minute. **Figure 2** further illustrates that letter sound knowledge in English precedes the ability to recognize words and the ability to decode nonwords, and fluency rates of all three skills are related and increase together.

Figure 2: Percentile distribution on all timed subtasks, English

