



EDDATA II

Early Grade Reading Kenya: Baseline Assessment



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Early Grade Reading Kenya Baseline Assessment

Analyses and Implications for Teaching Interventions Design

Final Report
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Prepared by
RTI International
3040 Cornwallis Road
Post Office Box 12194
Research Triangle Park, NC 27709-2194

RTI International is a trade name of Research Triangle Institute.

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Abbreviations

AKF	Aga Khan Foundation
CRS	Coastal Rural Support Programme
EADDEC	East African Development Consultants
EGR	Early Grade Reading
EGRA	Early Grade Reading Assessment
EMACK	Education for Marginalized Children
KCPE	Kenya Certification of Primary Education
KESI	Kenya Education Staff Institute
KIE	Kenya Institute of Education
KNEC	Kenya National Examination Council
MOE	Ministry of Education
MRC	Madrasah Resource Center
RTI	RTI is a trademark name of Research Triangle Institute
USAID	United States Agency for International Development

1. Summary

The findings presented in this report indicate that the students in schools chosen for EGRA project are performing below the middle of Standard 2 acceptable reading fluency standards.

In the one-minute timed randomized letter recognition task, students were able to name 4.7 in Kiswahili and 22.7 in English in one minute. Poor performance in the Kiswahili letter recognition task can be explained by the fact that students often use English letter names to name Kiswahili letters, which would be scored incorrectly. This observation merits further discussion around the scoring rules. Fluency in English, at only 22.7 letters per minute, is also low.

It is important to put some of these numbers into perspective. The letter recognition fluency in English was 22.7 in the middle of Standard 2. For the sake of comparison, in the US, some of the leading reading assessment experts have normed that a student at the end of pre-unit (Kindergarten) reading less than 40 should be considered at some risk, and reading less than 27 definitely at risk. Thus, the average level of letter reading fluency in this study was, in the middle of Standard 2, at half of what in the US would be considered to put the student at some risk at the end of pre-unit. Just as interesting, 25% of students assessed, in the middle of Standard 2, could not read any letters at all. 60% of Standard 2 students in this study would have been considered at definite risk in the US, even at the end of pre-unit (one and a half years earlier). For all that follows the comparisons against international standards would be similar.

For the word recognition task in disconnected text, also timed at one minute, students performed better in Kiswahili than in English, 11.7 correct words per minute (cwpm) and 7.5 cwpm respectively. On a similar task but in a connected text (reading fluency task) the students are performing below a tentatively agreed goal for Kenya (for purposes of this assessment only) of 45 correct words per minute on the fluency task. When tested in Kiswahili language students read on average 10.2 cwpm. The performance for English language is about the same, 11.4 cwpm. The student performance on the comprehension task is at an equal level for both languages, 0.4 correct answers out of possible 5. (See Annex 3 for means and standard deviations on all tasks).

Kiswahili		Average
K. Letter recognition		4.7
K. Word recognition		11.7
K. Passage words		10.2
K. Comprehension score		0.4
English		Average
E. Letter recognition		22.7
E. Word recognition		7.5
E. Passage words		11.4
E. Comprehension score		0.4
E. Phoneme segmentation		11.5

Calculated by the EGR Kenya Report authors

		Kiswahili Average	English Average
Letter recognition	T	4.8	21.6
	C	4.5	23.8
Word recognition	T	10	5.8
	C	13.3	9.1
Passage reading	T	8.7	9.3
	C	11.8	13.4
Comprehension questions	T	0.36	0.34
	C	0.53	0.45

Calculated by the EGR Kenya Report authors

Since this study is a baseline, for both treatment and control schools, it is important to see whether treatment schools are performing better, worse, or the same as control schools at the baseline. On average, control schools are performing better than treatment schools on all tasks for both languages except for letter recognition. This finding will be taken account for the post-treatment analysis adjustments. While the overall performance is fairly low, it must be also noted that some of the treatment schools are performing at almost zero level on fluency in the passage reading task (see section 3.6). It is important that, while developing the remedial design

interventions, special care is given to these schools. The schools lagging the most are singled out in the main text below.

Correlation analyses also indicate that there are high correlations on performance within all tasks (except for letter recognition) not only within one language but also between two languages – Kiswahili and English. For example, the correlation between word recognition in disconnected text in Kiswahili and reading fluency task in English is 0.94. This correlation when looked at the school level is 0.97. The fact that skills correlate extremely well between languages has two important implications, with different remedial considerations for the poorly-performing schools: a) either, as many reading experts claim, reading skills do readily transfer across languages, or b) schools that do a good job in general are doing a good job teaching reading in both languages, even if there is no direct transfer of skills between languages. In effect it is likely that a little of both of these factors is behind the observed correlation.

2. Study background

2.1. The EGRA Project

RTI International currently holds the EdData II contract from USAID/Washington. EdData II is a USAID funded program that has (in its original shape) supplied survey-based data on education in countries worldwide since 1997. The data are used for planning, monitoring, and evaluating education policies and programs. EdData II Task 2, a sub activity of EdData II, aims to develop accurate and timely education data collected through the design and implementation of an innovative mix of smaller-scale qualitative and quantitative data collection methodologies.

One of the activities EdData II Task 3 has been asked to engage in is the development of a set of tools constituting an Early Grade Reading Assessment (EGRA) for use worldwide. Under Task Order 2, a small sample survey is to be developed to be used as an example for an Education Survey Research course that would build District level capacity to use data for decision-making to improve education quality. The overall idea has been to utilize this opportunity to carry out a baseline survey of early grade reading and develop a limited but scientifically rigorous and well-informed pilot or test intervention in reading improvement, develop remedial interventions, and measure the results. The working hypothesis is that such an intervention can be designed, implemented, and tested within the period of one year (though it may need to span more than one calendar year). In addition, the results will be documented and incorporated into training on the use of simple assessment and statistical techniques in quality monitoring.

The EGRA activity in Kenya is targeting 40 schools – 20 treatment and 20 control schools. Reading proficiency in both the baseline and after an intervention is being assessed in both treatment and control schools – for which a reading assessment instrument was developed for both English and Kiswahili languages. Teachers in the treatment schools will be trained and supervised with a given number of days of support over the year (for which a set of remedial or improvement interventions will be developed). (In addition, teachers will be urged to use the instruments themselves over the year and will be assisted with this classroom-based assessment.) At the end of the EGR activity, reading will be assessed again in both treatment and control schools and results compared. The outputs of the EGR activity will be:

- a) EGR assessment tools appropriate to EMACK¹ schools developed;
- b) Remedial interventions planned and applied;
- c) Teachers in treatment schools exposed to EGR assessment and intervention;
- d) Hopefully, documented improvements in students's early-grade reading skills; and

¹ Education for Marginalized children in Kenya (EMACK) is a USAID funded project currently implemented by the Aga Khan Foundation, with which EdData II is collaborating.

- e) Experience documented and captured on the use of surveys and statistics and made available to the community at large.

RTI International has entered into a partnership with the Aga Khan Foundation (AKF) with the following distribution of roles: a) RTI International will conduct external reading assessments (baseline and post-treatment assessments) and provide technical assistance in development of both reading assessment instruments as well as pedagogical intervention protocols, and b) AKF will implement the teacher training interventions as a part of the EMACK II project.

Malindi district was chosen by AKF-EMACK II project as a target district for the EGR activity based on two considerations: first, it is a marginalized region with virtually no non-governmental organizations (NGOs) operating in the area and, second, the area has a high poverty level. The district has a population of about 545,000 inhabitants. It has 3 administrative divisions, Magarini, Malindi, and Marafa, and has 6 educational zones. Schools included in this survey were sampled by EMACK with the support from the Malindi district education office. Out of 40 selected schools, 7 intervention schools were inaccessible (swamps could not be crossed), so they were replaced with 7 other schools that were accessible and shared the same socio-economic background. If EMACK will focus their intervention or treatment, it is critical that the EMACK project now consider those 7 to be in the treatment group, since it is for these that the baseline was drawn. If EMACK is going to provide the treatment to all schools in the EMACK area, then the treatment schools will be represented by another random sample in the post-treatment period in any case, so the issue does not arise. But it is extremely important to emphasize that if the treatment will be limited to a given sub-set of schools, these have to be the same ones for which the baseline was drawn.

RTI contracted East African Development Consultants (EADEC), a Kenyan firm specialized in data-gathering, to conduct two external reading assessments (the first in July 2007 and the second in November 2008) of twenty Standard 2 students in each of the 20 treatment and the 20 control schools. The rationale behind choosing Standard 2 students for testing is that students in pre-unit (kindergarten), Standard 1, and Standard 2 would be intervened with the extra EGR help. Given that students in Standard 1 will be receiving reading improvement interventions for a whole year (second half of 2007 and first half of 2008), it will be possible to detect some improvement in class 2 (thus after the completion of year 1) by 2008, even after the first round of interventions. Full effect will not be felt until 2009, when, it is hoped, those in pre-unit in 2007 and in Standard 1 in 2008 will have been exposed to the improved teaching of reading. However, this contract does not cover 2009. It is expected that USAID will fund a further assessment at that point, or the EMACK itself will do so. The cost should be quite moderate, once the methodology is well-established.

The text presented below provides analysis of data collected in July 2007 and offers suggestions for both the administration of the next data collection survey taking place in November 2008 and remedial interventions design to be applied in the treatment schools during the academic 2007/08 year. The analysis informed the remedial interventions design workshop that took place in Mombasa during August 25-31, 2007.

2.2. The EGRA Instrument

Under a separate Task Order in the EdData II contract, USAID funded the basic development of the Early Grade Reading Assessment. The purpose of that Task Order was to provide USAID with a valid set of instruments for assessing the extent to which early-grade primary-school students in USAID-presence countries are learning to read with an acceptable degree of comprehension and at an acceptable rate of fluency. The overarching objective is to provide USAID with an increased understanding of one essential dimension of education quality (reading) in its host countries, and

ultimately spur more effective efforts to improve educational quality. To this end, USAID asked RTI to develop two reading assessment instruments: 1) an opportunity to learn assessment; and 2) a simple-screening assessment. On November 16-17, 2006, RTI convened a meeting of cognitive scientists, early-grade literacy experts, research methodologists, and assessment experts to review the proposed key components of the draft assessment instruments. During the 2-day workshop, participants were charged with bridging the gap between research and practice; that is, merging advances in the reading literature and cognitive science with assessment experiences. Researchers and practitioners presented evidence on their strategies for measuring literacy acquisition within the early primary grades. In addition, they were asked to identify the key issues to consider in designing a multi-country, multi-language early grade literacy assessment protocol. The workshop, co-hosted by USAID, The World Bank, and RTI, included more than a dozen experts from a diverse group of countries, as well as some 14 observers from institutions such as USAID, the World Bank, the William and Flora Hewlett Foundation, George Washington University, the South Africa Ministry of Education and Plan International, among others.

Based on the results of this workshop, RTI developed draft protocols for the in-depth and simple-screening assessments. The RTI team reviewed the comments, submitted and proposed materials and lessons learned and developed draft assessment instruments, sampling protocols, and enumerator training manuals for the piloting of each of the draft in-depth and simple-screening instruments.²

On April 23-27, 2007, RTI International organized the first EGR workshop in Mombasa, Kenya, with the objective to assist Kenyan education experts in the development of draft assessment tools, one in English and one in Kiswahili.³ The workshop proved to be a great opportunity for the mentioned experts to review the international literature and Kenyan experience. Attention was drawn to the power of measurement in improving learning, and the impact of a quality improvement control loop including measurement, teacher training, and supervision.

On 25 April 2007, the EGRA participants visited Concordia Primary School, a peri-urban school in a low-income community outside Mombasa town (low-income status is symbolized by the presence of, e.g., 180 students in one class in Std 1). The purpose of this visit was to pre-test the instruments which had been constructed. Though on vacation, approximately 100 pupils had come to the school by special request. The deputy head-teacher, and 3 teachers as well, all female, were present. The selection of students was not scientifically randomized (the 100 present was not random, and the choice of 58 students to be tested out of those present was also not necessarily random), and at the same time it is important to mention that it was a bit early in year, thus Standard 2 results are really close to end-of-year Standard 1, and Standard 3 results really more like end-of-year Standard 2 (the students had finished their 1st term). Students were tested in either Kiswahili or English (not both languages for any given pupil).⁴ Approximately equal numbers of girls and boys, in Std 2 and 3, and in English and Kiswahili skills, were tested.

The pilot testing of the instruments provided further insights for the workshop participants for the improvement and finalization of the instruments. Students were very cooperative and willing to

² The resulting recommendations can be viewed at <http://www.eddataglobal.org/documents/index.cfm?fuseaction=showdir&ruid=1&statusID=3&startRow=11>.

³ Stakeholders included Ministry of Education, KIE, KESI, KNEC, AKF (EMACK II, MRC), CRS, EADEC and university scholars. RTI International contracted two international early grade reading consultants, Marcia Davidson from University of Maine and Sylvia Linan-Thompson from University of Texas at Austin, who provided research findings and general information on reading assessments.

⁴ Note that for the Baseline Assessment conducted (and presented in this report) in July 2007, each student was tested both in English and Kiswahili languages.

respond to all questions, although some needed directions in Kiswahili. One interesting observation was that some students read the connected text passage in English, but were unable to answer comprehension questions that were asked in English. These same few students were able to answer the questions in English, when they were asked in Kiswahili. This observation was taken into consideration during the baseline survey for which the assessors were instructed to use Kiswahili only when a student does not understand questions in English. At no other point was Kiswahili used when the skills being assessed were English oral reading skills versus comprehension.

At the end of this effort, a prototype of an EGRA tool was developed, one version in English and one in Kiswahili, with the following components:

- § background questions
- § letter-name fluency task
- § word recognition task
- § oral reading of a connected text passage with comprehension questions, and
- § phoneme segmentation

Following the workshop, RTI appointed a consultant, Prof. Shashi Bali to assist EADEC in finalizing the instruments for the Baseline assessment. In consultations with Kenya Education Staff Institute (KESI), EADEC and Prof. Bali finalized both English and Kiswahili Instruments. These instruments were further revised during the training of assessors prior the Baseline Assessment in July 2007.

Background questions section:

In this section, the following information was collected: school name, student name, standard, age, gender, whether a student went to kindergarten, language mostly spoken at home, who is helping a student with the homework, what materials does a student read at home, and do they watch TV or listen to radio at home. This section of the instrument was also used to establish rapport with the students, an important task in oral, one-on-one testing by outsiders.

Letter recognition

For this task, students were asked to provide the name and not the sound of each letter of the alphabet in English and Kiswahili languages. Letters of the alphabet (capitalized for English) were included in this task and were listed in random order in order to assess letter recognition and naming fluency, as opposed to alphabet memorization. For the purpose of scoring, there were 11 lines with 10 letters on each line. The number of correctly identified letters was scored for each line and as such entered into the data base. Given that letters are identified differently in English and Kiswahili, the assessors were instructed not to score as correct those letters for which a student used English to identify Kiswahili letters and vice versa. In the end, the sum of all correctly identified letters within 60 seconds time-frame was recorded. Time taken to read all letters was also recorded but there were no cases where a single student identified all 110 letters within the timeframe of 60 seconds.

Word recognition

This task included a list of 60 words in English and 50 words in Kiswahili (10 lines with 6 and 5 words in Each for English and Kiswahili respectively). The difference in numbers of words included in two different languages was discussed and agreed upon during the instrument development workshop. The main reason for this difference was the fact that most of the Kiswahili words consist of two syllables, thus requiring more time to be read. Designed as such, the comparisons of performance in these two languages can be considered reliable. In other words, when using a standard of 60 correct words per minute, it was deemed important to factor in the difficulty and time required to read 60 words in one language as opposed to another. Many oral assessments use a list of words that would take a proficient reader approximately one minute to read, as a simple way of limiting the test to a

manageable length. Research indicates that testing reading fluency over a list of words long enough for a proficient reader to read in about 60 seconds provides a high level of reliability without taking too long to administer. If the students read very slowly, it also prevents the students from having to spend a long time with a passage that is too difficult for them. Thus, typically, oral reading tests are calibrated so as to allow a student reading at somewhere around 60 words per minute to read the passage or list in about one minute.⁵

Each student was asked to read every word as best as they could and as reasonably fast as they could, within 60 seconds. The assessors were instructed to mark as correct all those words that were read in acceptable formal pronunciation. If a student read all words in less than one minute, the time taken to complete the task was also recorded and entered into the database, so as to calculate the cwpm. Results were scored for each line and as such entered into the database. The sums of a) all words read irrespective of being correct or not, and b) all words read correctly within 60 seconds were also recorded. Finally, the assessors were instructed to record the time taken if the task was completed in less than 60 seconds.

Reading fluency

In this task, the students were asked to read a 62 word long passage in English and a 60 word long passage in Kiswahili. Both of these passages were developed in consultations during the April workshop with the focus on the cognitive development of a Standard 2 learner. The task was timed, so that the correct number of words read per 60 seconds was recorded. If a student read the passage in less than 60 seconds, the time taken to complete the task was recorded as well. The assessors were also instructed to record the number of words read correctly for each line and these scores were entered into the database. The number of words read incorrectly is also recorded and entered.

Given that the comprehension questions task was based on the passage text from the reading fluency task, the assessors were instructed to allow students to read through the end only if approximately 75% of the passage was read within 60 seconds. In all other instances, the assessors were instructed to terminate the reading task.

Comprehension questions

Following each of the passages mentioned above (one in English and one in Kiswahili) a student was asked 5 comprehension questions for each passage. The questions were literal questions requiring students to recall or understand specific information about the passage. They were not inferential questions that required students to interpret the passage. However, they did not require only "true" and "false" answers. For instance, students were not asked to simply remember if a story was about a boy and a dog, but rather who had a dog and whether the dog was big or little, thin or fat, etc. The total number of correct answers was recorded and as such entered into the database.

Phoneme segmentation

During the pilot testing of the draft instrument in April 2007, it was found that many students did not understand the phoneme segmentation task. They just did not understand what they were being asked to do. Only very few were able to segment any words. Several students stretched the word or said it very slowly and it was difficult to determine whether they were actually segmenting sounds, or just saying the word very slowly. There seems to be little realization in the environment of the importance

⁵ See, for example, <http://dibels.uoregon.edu/measures/orf.php>, <http://www.hodder-tests.co.uk/tfsearch/ks2/reading/hort.htm>, <http://cenmi.org/msdb-LIO/downloads/Literacy/ReadingWritingBraille/ReadingFluency.doc>, and see also the recommendations from the November 2006 meeting already discussed above.

of the task even in a syllabic language. In general the whole task was unfamiliar not only to students but to assessors as well.

During the finalization stage it was agreed to omit the phoneme segmentation from the Kiswahili instrument. However, the English part of the instrument kept the phoneme segmentation that was to be fully administered in English. Whether practiced or not, the curriculum in English does imply that phonemic awareness should be taught, so it was decided to keep this task.⁶ For this task, students are asked to pronounce each phoneme of a very simple word that was read to them. In total, there were 10 one-syllabus words. The scores were recorded and entered into the data base as follows: a) number of correct phonemes spoken for each word, and b) sum of all of sounds spoken correctly (the total of possible correct sounds was 30). This can enable the analysis of what combinations of consonants and vowels is most or least difficult for students, in addition to having an overall picture of how well do students recognize sounds in spoken English.

(See Annex 1 for Kiswahili and English instruments.)

2.3. Summary of the EGRA Project steps

- § October 2006: RTI conducted a small-scale survey in a number of schools in the Coastal Province, Kenya. The findings of this survey indicate similar results to those presented in this report.
- § November 2006: RTI convenes a stakeholder panel in Washington D.C. to review and improve the draft instruments in the overall EGRA approach (funded by USAID Washington for potential application in any USAID country).
- § April 2007: RTI convenes a stakeholder workshop in Kenya to: a) launch the EGR-Kenya Project, b) review and Kenyanize the EGRA instruments.
- § May 2007: RTI enters into the partnership with the Aga Khan Foundation, the implementer of USAID's Education for Marginalized Children in Kenya,
- § July 2007: RTI appoints East African Development Consultants to conduct a Baseline Assessment study in District Malindi. Eight highly qualified assessors were appointed and trained by EADEC and RTI's consultant Prof. Shashi Bali.
- § August 2007: RTI analyzes collected data and submits the draft report to the USAID/Washington, USAID/Nairobi, KESI, the Aga Khan Foundation/EMACK, and the Kenya Education Staff Institute.
- § August 2007: RTI provides technical assistance to the Aga Khan Foundation/EMACK to develop a set of remedial interventions to be applied in 20 treatment schools.
- § January 2008: the Aga Khan Foundation/EMACK begins the implementation of remedial interventions in 20 treatment schools
- § November 2008: RTI extends contract to EADEC to conduct post-treatment assessment in all 40 schools. Final report written and shared with relevant stakeholders.

⁶ We were given to understand that this is more explicit in the current curriculum or syllabus, which is, as we understood, not official yet, than in the 2002 version which is official.

3. Analyses

3.1. Approach

The analyses presented below consist of four sections:

A. Background section: during the April workshop, stakeholders felt that it is important to collect information about student background on a number of different items. It was agreed that the following information should be included: did students attend kindergarten, what is the language mostly spoken at home, are they being helped with the homework by their parents, do they read written materials at home, and do they watch TV or listen to radio at home. The analyses presented below are merely descriptive and show some interesting observations that can aid the design of remedial interventions especially if parental and community assistance is to be sought.

B. Average student performance on all tasks: In this section, the comparison of student performance between control and treatment schools for all variables (means and standard deviations) is presented.

C. Correlations of all tasks: the findings for this section were presented in two steps as well: 1) correlations between all tasks within each language, analyzed at both student and school levels, and also comparisons of the correlations between tasks within each language (to determine, for instance, whether the correlation between performance in word recognition in disconnected text and reading fluency in connected text was higher within Kiswahili than within English), and 2) correlations between two languages, also analyzed by student and school levels, in order to possibly identify some cross-language pedagogical issues and skill transfer.

D. School ranking: in this section schools have been ranked by their performance using the average scores for all tasks in English and Kiswahili. This section was developed to guide the focus of remedial interventions and to indicate which schools deserve more attention.

Note: For all of the tasks mentioned above, analyses of variables that include and exclude 0 scores have been performed. A variable that includes the 0 scores takes into account all students that have been tested, thus those students who did not respond to any of the tasks at all and thus received 0 scores. These students have been excluded from the variable with no 0 scores. In other words, for those variables, only those students who attempted and responded to the tasks to some measurable degree were included in this variable. The reason for presenting the information in this way is that some readers may want to know the fluency of those who were able to read at all. But this overstates the fluency of the average student, since some students simply could not read. For that reason the data are also presented taking into account those who could not read at all, by giving them a zero score for fluency. In order to highlight the importance of 0 performers, of the 800 pupils tested in Malindi, 156 could not identify a single letter in English, 379 could not recognize an English word from the word list, and 405 could not read any of the English connected text.

3.2. Background section: findings

The EGRA instruments designed for Kenya included a series of questions eliciting information on whether students went to kindergarten, the language mostly spoken at home, whether parents help with homework, whether students read written material at home, and whether they watch TV or listen to radio at home. The responses to these questions provide interesting opportunities that should be explored while developing remedial interventions.

First, the majority of students, 81%, do not speak either English or Kiswahili at home (Table 1), while at the same time Kiswahili (18%) is used more than English (0.5%). These are important observations for the remedial intervention design especially if activities that involve parents are going to be included.

Table 1: Language spoken at home: Percentage of languages spoken and home and comparison between control and treatment schools

	Treatment		Control		Total	
	Freq	Perc	Freq	Perc	Freq	Perc
English	2	0.5	2	0.5	4	0.5
Kiswahili	61	15.3	73	18.3	134	16.8
Other	337	84.3	325	81.3	662	82.8

Calculated by the EGR Kenya Report authors

It is also very interesting to note that the huge majority of students reported that they attended pre-school or kindergarten – 92% (Table 2). This result suggests that even students in Malindi district, which is a very poor district, have considerable opportunities for attending pre-school education, which contradicts the generally perceived notion that there are simply not enough pre-school facilities and teachers to meet the demand for pre-school education. This is even more interesting given that Malindi district was chosen for this survey because of its high poverty level among other districts in the Coastal Region and for the fact that virtually no NGOs are operating and providing any support to the schools. It should be noted that Malindi district is among the poorest of the poor. According to the analysis of poverty levels throughout Kenya, Malindi district is ranked as the 9th poorest district out of 76 districts in the country level, and 3rd poorest out of 7 districts in the Coastal province. (See Annex 2 for district ranking by poverty levels).

The majority of students, 87%, reported that they receive help with their homework from their parents (or others) at home (Table 2). This indicates that the willingness of parents to assist their students with school-related activities exists and can be utilized for remedial interventions, especially when teachers are constrained to deliver quality instruction by large class sizes. Capitalizing on parental participation in reading improvement will be key to any intervention.

Close to 78% of students said that they have some written material available at home (Table 2), which again provides an opportunity for designing structured remedial interventions for the time spent reading at home. While the study did not uncover what type of written materials students read at home, it is likely that much of this reading is related to their homework. This again suggests possibilities for the intervention design. Taking advantage of students' home reading time will enable continuity in the learning process, ease the task of teaching, use parents to assist with reading efforts, and consequently lead to reading improvements.

Tested students listen to radio more often (70%) than watch TV at home (15%) (Table 2). Nevertheless, given the fact that students are more tuned to listening to radio, reading-focused radio instruction could conceivably be utilized as a venue for improvements of reading performance. Development of such interventions tends to be expensive and would be financially out of EGR's reach. Nevertheless, it can be included in other teaching training packages currently being implemented by AKF-EMACK II, and is something to think about.⁷

⁷ Kenya has had successful radio reading interventions before. See Teaching English by Radio: Interactive Radio in Kenya, Maurice Inhoof and Philip R. Christensen, Eds., Academy for Educational Development, Washington, DC, 1986.

Table 2: Percentages of students who responded ‘yes’ on background questions; overall and compared by school type

	Treatment	Control	Total
Pre-school education attendance*	91.5	93	92
Assistance with homework*	86	88	87
Reading material available at home	75	81	78
Do you watch TV	10	20.5	15
Do you listen to radio*	69.5	70	70

Calculated by the EGR Kenya Report authors

For all of the questions above, it needs to be noted that students in both control and treatment schools are at a fairly equal level except for TV exposure and reading at home. For the variables with an asterisk the differences are not significant at any standard level. Whether the differences for the other two variables, which are statistically significant, are of substantive significance, is hard to say. For reading materials almost certainly not. For TV-watching, while it is true that the control schools have almost twice as much TV-watching, it is also true that this is only 20.5% versus 10%. The two variables that one would suppose would make most educational difference, namely pre-school attendance and assistance with homework, are at essentially the same level. The data do suggest that control schools are in general from a slightly higher socioeconomic background, since all of the variables run in that direction—but this, one should note, is very slight. In any case, the fact that the control schools do seem to perform a little better on the reading tasks even at the baseline can be taken into account when measuring the difference post-treatment.

3.3. Student performance on all tasks

The interpretation of data presented in this section is organized as follows: a) analysis of scores that include ‘zero scores,’ thus includes students who could not respond to any of the tasks, and b) analysis of responses that do not include ‘zero scores,’ thus including only the scores of students who could respond to tasks to some extent. To present only one set of results in our view gives an incomplete picture. For example, in calculating correct words per minute (cwpm), including only those who could read, biases the results upwards, but including those who could not read does not give a true picture of the reading fluency of those who can indeed read.

Our approach is thus to present the data both ways. The data that exclude those who could not perform the task gives us a sense of the performance of those who could perform at all. The data that include those who could not perform the task, gives a sense of what the actual population of students is doing. Now, since the line between “can perform the task” and “can’t perform the task” is not clear (e.g., if a student can read only 2 words in one minute, can that student read well enough to have their fluency assessed, or not?—would the student be a non-reader and then excluded, or a reader and then included), in general we feel that the data that include those who could not perform the task is a more accurate reflection of what is taking place with the student population as a whole. Approached as such, the analyses provide insights into both overall school-by-school performance (by looking at both those who could and could not respond to tasks) and individual performance of those who could respond to tasks. Furthermore, some of the analyses have been conducted at both individual and school levels.

Finally, the tables presented below contain the mean, standard deviation, and the bottom and top ends of the confidence intervals (all refer to 95% confidence intervals). In addition, in most cases, the hypothesis test regarding a pre-existing difference between treatment and control schools is provided, as the hypothesis test is a more rigorous procedure than simply comparing whether the confidence

intervals overlap. These hypotheses tests are presented in each table as equations that read, for example (see Table 3) $Pr(T < t) = 0.3522$ and $Pr(T > t) = 0.6478$ referring in this example to the hypothesis test for the difference between control and treatment schools (control schools' mean minus treatment schools' mean). The interpretation of the first equation, for example, is that there is a 35.2% chance that students in any given sample of control schools read a little worse (4.5 versus 4.8) than the ones in the treatment schools, even if in the population as a whole they do not. In other words, there is a very large chance that the students in a given sample of control schools would happen to be reading worse, by luck of the draw, than the students in the treatment schools. We can thus conclude that, on this score at least, the treatment schools are not likely different from the control schools. When such probabilities are below 5% (0.05) or above 95% (0.95) we can interpret this to mean that, if there were truly no difference between the treatment and control schools, there would be a probability of only 5% of observing a difference as large as observed. Thus, for example, in table 4, we can conclude that students in the control schools are definitely reading English better, as there is only a 0.0004 probability that we would have observed such a large difference in our sample if there truly were none.

3.3.1. Letter recognition

For the letter recognition task, students were asked to provide the name of each letter of the alphabet in English and Kiswahili languages. Research shows that letter name recognition is a good predictor of later skills. Letters included were listed in random order to prevent simple recitation of the alphabet and thus test true visual letter recognition and fluency in translating visual input into oral output. Each table provides an overview of scores that include 'zero responses' and those that do not include 'zero' scores. And the results are broken down by the school type, thus by control and treatment schools.

Students are performing significantly better in English (22.7) than in Kiswahili (4.7) on the letter recognition task (Tables 3 and 4). This result may be explained by the fact that most of the students are using English names to identify Kiswahili letters, which would be scored incorrectly during the test. Evidently there is little instruction in recognition of letter names in the Kiswahili language. The issue around using letter names of in one language (English) to identify letter names of another language arose during the April workshop and this issue certainly merits more discussion.

As it will be seen below, such low performance in letter recognition and naming for Kiswahili does not necessarily translate into poor levels of reading fluency for the same language. Quite to the contrary, reading fluency in Kiswahili was higher than in English. If this is the case, then one can say that students indeed know letter sounds and know how to use them for reading, but they are not taught how to name them correctly. While this may be the case, it is still suggested that students are to be taught how to name Kiswahili letters correctly, as international evidence does suggest that letter naming is a good precursor of other skills. In addition, of course, this is a skill that is specified in the curriculum. The curriculum specifically suggests "recite and recognize." However, we would argue that mere recitation is not a sufficient test of skill, and that a timed randomized letter-naming assessment tests the true skill involved in fluent visual recognition and oral output.

At the same time, it can be observed that control and treatment schools are performing at an almost equal level for this task if zero scores are included. Nevertheless, the differences observed below need to be taken into account for the post-treatment data analyses.

Table 3: Kiswahili language letter recognition

Zero scores*		Mean	Std Dev	Bottom end of CI	Top end of CI
Treatment	400	4.8	10.7	3.7	5.9
Control	400	4.5	10.9	3.4	5.6
Combined	800	4.7	10.8	3.9	4

No Zero scores**		Mean	Std Dev	Bottom end of CI	Top end of CI
Treatment	139	13.00	14.3	11.7	16.6
Control	136	14.14	14.03	11.72	16.5
Combined	275	13.57	11.1	11.4	15.7

Calculated by the EGR Kenya Report authors

*Pr(T < t) = 0.3522 Pr(|T| > |t|) = 0.7044 Pr(T > t) = 0.6478

**Pr(T < t) = 0.2618 Pr(|T| > |t|) = 0.5236 Pr(T > t) = 0.7382

Table 4: English language letter recognition

Zero scores*		Mean	Std Dev	Bottom end of CI	Top end of CI
Treatment	400	21.6	18.4	19.8	23.4
Control	400	23.8	21.4	21.6	25.9
Combined	800	22.7	19.9	21.3	24.1

No Zero scores**		Mean	Std Dev	Bottom end of CI	Top end of CI
Treatment	314	25.3	17.08	23.4	27.17
Control	341	30.2	19.64	28.05	32.41
Combined	655	27.8	18.64	26.25	29.11

Calculated by the EGR Kenya Report authors

*Pr(T < t) = 0.9401 Pr(|T| > |t|) = 0.1197 Pr(T > t) = 0.0599

**Pr(T < t) = 0.9996 Pr(|T| > |t|) = 0.0008 Pr(T > t) = 0.0004

It is important to put some of these numbers into perspective. The letter recognition fluency in English was 22.7 in the middle of Standard 2. For the sake of comparison, in the US, some of the leading reading assessment experts have normed that a student at the end of pre-unit (Kindergarten) reading at less than 40 should be considered at some risk, and reading less than 27 definitely at risk. Thus, the average level of letter reading fluency in this study was, in the middle of Standard 2, at half of what in the US would be considered to put the student at some risk at the end of pre-unit. Just as interesting, 25% of students assessed, in the middle of Standard 2, could not read any letters at all. 60% of Standard 2 learners in this study would have been considered at definite risk in the US, even at the end of pre-unit. For all that follows the comparisons against international standards would be similar, or in some cases even worse.

3.3.2. Word recognition

An internationally acceptable goal for word recognition performance in developing countries can be set at the level of 60 correct words per minute (cwpm) at the end of Standard 2.⁸ During the April workshop, and after the visit to Concordia school, stakeholders have discussed this goal and agreed that it should be lowered to 45 correct words per minute for the Kenyan context. This would take into account Kenya's linguistic complexity. This goal is not meant to suggest overall policy for Kenya, only for purposes of this assessment. At some point it would be interesting to discuss overall policy, as informed by this and other research experiences. The results of the pilot-testing in April suggested that this standard will be hard to achieve. The results of this baseline survey in Malindi suggest this is indeed the case - the average was 11.7 for Kiswahili, and 17.7 for English for all schools. During the baseline assessment in July, it was found that the percentage of students who read more than 45 correct words per minute across languages was very low – 2.4% (Table 5). This reinforces what was said about even letter naming fluency above.

Table 5: Number of students who could read more than 45 correct words per minute in disconnected text

	Kiswahili		English	
	Freq	Perc	Freq	Perc
Treatment	3	0.8	3	0.8
Control	12	3	10	2.5
Total	15		13	

Calculated by the EGR Kenya Report authors

The authors of the report also present the percentage of students who can read more than 25 correct words per minute in Kiswahili (21%) and English (9%) to further illustrate how poorly students are performing on this task (Table 6). At these performance levels it is hard to expect that students are fluent enough to comprehend much, and yet only few were able to perform at this level.

Table 6: Percentage of students who can read more than 25 correct words per minute

	Kiswahili		English	
	Freq	Perc	Freq	Perc
Treatment	59	15	22	6
Control	107	27	49	12
Total	166		71	

Calculated by the EGR Kenya Report authors

When means for the word recognition task are compared between two languages, it can be noted that students are on average better in Kiswahili (11.7) than in English (7.5) (Tables 7 and 8). Control schools have higher means for both languages than the treatment schools. In case of Kiswahili, the mean for treatment schools is 10, while the mean for the control schools stands at the level of 13.3. For English language, the mean for control schools is 9.1 as opposed to 5.8 for the treatment schools.

⁸ See Abadzi, H, L. Crouch, M. Echegaray, C. Pasco, and J. Sampe, "Monitoring Basic Skills Acquisition through Rapid Learning Assessments: A Case Study from Perú," *Prospects*, Issue 134, 35(2), June 2005.

Table 7: Kiswahili language word recognition

Zero scores*		Mean	Std Dev	Bottom end of CI	Top end of CI
Treatment	400	10.	12.5	8.8	11.2
Control	400	13.3	14.7	11.9	14.8
Combined	800	11.7	13.7	10.7	12.6

No Zero scores**		Mean	Std Dev	Bottom end of CI	Top end of CI
Treatment	276	16	12.4	14.5	17.5
Control	250	19.3	14	17.5	21.1
Combined	526	17.7	13.3	16.5	18.83

Calculated by the EGR Kenya Report authors

*Pr(T < t) = 0.9997 Pr(|T| > |t|) = 0.0006 Pr(T > t) = 0.0003

**Pr(T < t) = 0.9977 Pr(|T| > |t|) = 0.0045 Pr(T > t) = 0.0023

Table 8: English language word recognition

Zero scores*		Mean	Std Dev	Bottom end of CI	Top end of CI
Treatment	400	5.8	9.5	4.9	6.7
Control	400	9.1	13.1	7.8	10.4
Combined	800	7.5	11.5	6.6	8.2

No Zero scores**		Mean	Std Dev	Bottom end of CI	Top end of CI
Treatment	219	11.5	10.6	10	12.9
Control	202	16.7	13.7	14.8	18.4
Combined	421	14.2	12.5	12.9	15.3

Calculated by the EGR Kenya Report authors

*Pr(T < t) = 1.0000 Pr(|T| > |t|) = 0.0000 Pr(T > t) = 0.0000

**Pr(T < t) = 1.0000 Pr(|T| > |t|) = 0.0000 Pr(T > t) = 0.0000

3.3.3. Reading fluency in connected text

Table 9 provides an overview of reading fluency levels for English and Kiswahili languages. Students are doing almost equally well in both languages reading connected text. However, it is important to note, especially for the analysis of the post-treatment data, that the control schools are performing better than the treatment schools on the fluency tasks in both languages (Tables 10 and 11).

Table 9: Percentage of students able to read even a few words in connected text in English and Kiswahili

	Kiswahili		English	
	Freq	Perc	Freq	Perc
Treatment	182	46	183	46
Control	226	57	211	53
Total	408		394	

Calculated by the EGR Kenya Report authors

As was the case with the reading fluency level above, students in both languages are performing at almost an equal level. If we look at the performance in reading fluency that include 0 scores, Performance in Kiswahili language (10.2) seems to be a bit lower than in English (11.4), but not significantly (Table 10 and 11). Control schools are performing a little better than treatment schools. In Kiswahili, the mean for control school is 11.8 correct words per minute, while the mean for treatment schools is 8.7. In English, the mean for control schools is 13.4 correct words per minute, while the mean for treatment schools is 9.3.

During the instrument design workshop (April 2007), it was agreed that for the reading fluency task, a goal of 45 correct words per minute could be accepted for Kenya, for purposes of this assessment. The fluency levels presented indicate that by the end of the treatment students will have to improve significantly to reach such a standard. The fluency levels illustrated in Tables 10 and 11 show that students are not reading fast enough to be able to understand the text and respond to comprehension questions (which is reflected in poor performance on this task as well—see below).

Table 10: Kiswahili - average number of correct words per minute read (in connected text)

Zero scores*		Mean	Std Dev	Bottom end of CI	Top end of CI
Treatment	400	8.7	13.1	7.4	10.0
Control	400	11.8	14.7	10.3	13.2
Combined	800	10.2	14	9.2	11.2

No Zero scores**		Mean	Std Dev	Bottom end of CI	Top end of CI
Treatment	230	18.9	13.5	16.9	20.8
Control	184	20.4	14.1	18.3	22.5
Combined	414	19.6	14	18.4	21

Calculated by the EGR Kenya Report authors

*Pr(T < t) = 0.9990 Pr(|T| > |t|) = 0.0020 Pr(T > t) = 0.0010
 **Pr(T < t) = 0.8711 Pr(|T| > |t|) = 0.2579 Pr(T > t) = 0.1289

Table 11: English- average number of correct words read (in connected text)

Zero scores*		Mean	Std Dev	Bottom end of CI	Top end of CI
Treatment	400	9.3	14.2	7.9	10.7
Control	400	13.4	17.8	11.7	15.2
Combined	800	11.4	16.2	10.2	12.5

No Zero scores**		Mean	Std Dev	Bottom end of CI	Top end of CI
Treatment	182	20.4	14.6	18.2	22.6
Control	218	24.6	17.6	22.2	27
Combined	400	22.7	16.4	21	24.3

Calculated by the EGR Kenya Report authors

*Pr(T < t) = 0.9999 Pr(|T| > |t|) = 0.0003 Pr(T > t) = 0.0001
 **Pr(T < t) = 1.0000 Pr(|T| > |t|) = 0.0000 Pr(T > t) = 0.0000

3.3.4. Comprehension questions

After reading each of the passages (one in English and one in Kiswahili) a student was asked 5 comprehension questions for each passage.⁹ The maximum number of correct answers was thus 5 for English and 5 for Kiswahili. It is important to remember that these two tests were not just translations of each other, but rather each discussed somewhat different topics. Thus, there was no possibility that a student could get one passage's answers from the other. The comprehension questions in both tasks are completely different.

Students are on average answered correctly around 0.45 questions for Kiswahili and 0.39 for English language out of 5 possible for each language (this analysis includes 0 scores). Naturally, when students who were in fact capable of reading were tested, the response increases considerably. As observed in other tasks, control schools are performing better in both English and Kiswahili. Performance in Kiswahili tended to be better than performance in English. (Tables 12 and 13).

Table 12: Kiswahili - average number of correctly answered comprehension questions

Zero scores*		Mean	Std Dev	Bottom end of CI	Top end of CI
Treatment	400	0.36	0.98	0.26	0.46
Control	400	0.53	1.2	0.41	0.65
Combined	800	0.45	1.1	0.37	0.52
No Zero scores**		Mean	Std Dev	Bottom end of CI	Top end of CI
Treatment	74	2.74	0.88	2.53	2.94
Control	53	2.86	1.08	2.57	3.16
Combined	127	2.81	0.99	2.63	2.98

Calculated by the EGR Kenya Report authors

*Pr(T < t) = 0.9848 Pr(|T| > |t|) = 0.0304 Pr(T > t) = 0.0152
 **Pr(T < t) = 0.7700 Pr(|T| > |t|) = 0.4600 Pr(T > t) = 0.2300

Table 13: English- average number of correctly answered comprehension question

Zero scores*		Mean	Std Dev	Bottom end of CI	Top end of CI
Treatment	400	0.34	0.90	0.25	0.43
Control	400	0.45	1	0.34	0.54
Combined	800	0.39	0.95	0.32	0.45
No Zero scores**		Mean	Std Dev	Bottom end of CI	Top end of CI
Treatment	98	1.71	1.30	1.45	1.98
Control	80	1.82	1.28	1.53	2.10
Combined	178	1.77	1.29	1.58	1.96

Calculated by the EGR Kenya Report authors

*Pr(T < t) = 0.9357 Pr(|T| > |t|) = 0.1287 Pr(T > t) = 0.0643
 **Pr(T < t) = 0.7026 Pr(|T| > |t|) = 0.5948 Pr(T > t) = 0.2974

⁹ If a student read more than three sentences of the passage, s/he was allowed to proceed to answering comprehension questions that could be answered from the text read.

Phoneme segmentation

The performance for this task in English language shows that students are able to sound on average 11.5 correct phonemes out of possible 30 correct answers. Both treatment and control schools are performing equally well: 11.6 for treatment schools and 11.4 for control schools (Table 14). As it will be seen below in the correlation analysis, the correlation between letter recognition and phoneme segmentation is not very high: 0.22.

Table 14: English- average number of phonemes correctly identified

Zero scores*		Mean	Std Dev	Bottom end of CI	Top end of CI
Treatment	400	11.6	9.3	10.7	12.5
Control	400	11.4	9.7	10.4	12.4
Combined	800	11.5	9.5	10.8	12.2

No Zero scores**		Mean	Std Dev	Bottom end of CI	Top end of CI
Treatment	284	15.7	7.3	14.9	16.6
Control	295	16	7.6	15.2	16.9
Combined	579	15.9	7.5	15.2	16.5

Calculated by the EGR Kenya Report authors

*Pr(T < t) = 0.3791

Pr(|T| > |t|) = 0.7582

Pr(T > t) = 0.6209

**Pr(T < t) = 0.6952

Pr(|T| > |t|) = 0.6096

Pr(T > t) = 0.3048

3.4. Correlation Analyses

3.4.1. Correlations of all tasks in English and Kiswahili

The correlation analyses have been conducted for all tasks for the English and Kiswahili instruments. The first step was to look at correlations between all tasks within each language, and then to analyze correlations for the same task between two languages both at the student and school levels.

Additional analyses such as correlations between the tasks and variables for which the answers were gathered through the background section questions, have been conducted (Annex 4). They have not been included in the main body of this report as they do not show high correlations. This tends to imply that at least the background issues examined here are not having much impact on student reading performance.

3.4.1.1. Student level correlations

The correlations between the letter recognition and word recognition (0.33) and reading fluency tasks (0.34) are not very high in Kiswahili, probably because Kiswahili letters are not taught in a regular way (sometimes they are taught as sounds, sometimes as names, and the students are clearly confused). They tend to be higher in English, where letter recognition is correlated with word recognition at the level of 0.65 and with reading fluency at 0.65. The correlations between letter recognition and comprehension questions (0.45) and phoneme segmentation do not to appear as strong (0.22).

The strong correlations in all this are clearly between word recognition and reading fluency in both languages, at 0.92, and between word recognition and the overall comprehension questions, at 0.69 for both languages. Correlations between fluency and comprehension scores have been found to be high for both languages, 0.80 for English and 0.72 for Kiswahili. Finally, correlations between phoneme segmentation and other tasks are very low. This may be because phoneme segmentation is not taught in schools in a way that might contribute and lead to reading fluency. In any case this needs to be taken into account in the design of the intervention. (Tables 15 and 16).

Table 15: Kiswahili: Individual level correlations within Kiswahili language (0 scores included)

	LR	WR	PR	CS
Letter recognition (LR)	1			
Word recognition (WR)	0.33	1		
Passage words (PR)	0.34	0.92	1	
Comprehension score (CS)	0.24	0.69	0.80	1

Calculated by the EGR Kenya Report authors

Table 16: English: Individual level correlations within English language (0 scores included)

	LR	WR	PR	CS	PS
Letter recognition (LR)	1				
Word recognition (WR)	0.65	1			
Passage words (PR) fluency	0.65	0.92	1		
Comprehension score (CS)	0.45	0.69	0.72	1	
Phoneme segmentation (PS)	0.22	0.23	0.22	0.12	1

Calculated by the EGR Kenya Report authors

3.4.1.2. School level correlations

High correlations between all tasks except for phoneme segmentation were observed in the analysis of school-level performance. Since, realistically, in a country with such large classes, the level of intervention is somewhat more likely to be the school or classroom than the individual student, it is important to focus on school-level correlations. With the introduction of the Free Primary Education Act in 2003, schools have seen a large influx of students putting a burden on schools and teachers. Today, classrooms with enrolments of 80 students and above, per class, is often the rule rather than the exception. In such circumstances, it is hard to imagine much individual or student tailored instruction. In these cases, information about classroom performance, rather than individual performance, is more useful to teachers and to those monitoring the system.

When analyzed by school level, correlations between all tasks tend to be higher than what was observed for student-level performance, since within-school variation is suppressed. The correlation between word recognition and reading fluency in Kiswahili is 0.97 and English is 0.98, which is not that much significantly higher than student-level correlations, 0.92 for both languages. The real difference can be observed in correlations between word recognition and comprehension scores: a) 0.83 for Kiswahili and 0.89 for English for school-level performance while the student-level performance for the same tasks was at the levels of 0.69 for both English and Kiswahili. (Tables 17 and 18).

Table 17: Kiswahili: School level correlations within Kiswahili language (0 scores)

	LR	WR	PR	CS
Letter recognition (LR)	1			
Word recognition (WR)	0.48	1		
Passage words (PR)	0.53	0.97	1	
Comprehension score (CS)	0.42	0.83	0.88	1

Calculated by the EGR Kenya Report authors

Table 18: English: School level correlations within English language (0 scores)

	LR	WR	PR	CS	PS
Letter recognition (LR)	1				
Word recognition (WR)	0.77	1			
Passage words (PR)	0.76	0.98	1		
Comprehension score (CS)	0.60	0.89	0.89	1	
Phoneme segmentation (PS)	0.33	0.27	0.29	0.10	1

Calculated by the EGR Kenya Report authors

3.4.2. Correlations across languages

The correlations presented below in Tables 22 and 23 show all tasks except for letter recognition and phoneme segmentation are highly correlated across languages. This implies either that reading skills transfer between languages, or that schools that do a good job in one language also tend to do a good job in another. Which of these factors is more important than the other cannot be answered with the data at hand. However, the policy implication is clear regardless of the ultimate causality: perhaps choice of initial language of instruction matters somewhat less than overall proficiency of reading instruction. It has to be borne in mind, though, as already noted, that Kiswahili is not a true home language expect for a small minority of students.

3.4.2.1. Student-level correlations

Correlations in letter recognition across languages have not been found to be high, probably because of the problem, already discussed several times, of ambiguous teaching of the Kiswahili letter sounds (sometimes Kiswahili letters are taught as sounds, sometimes as names, and students clearly do not name them with any regularity). The same has been found for the phoneme segmentation task. However, correlations across languages for word recognition, fluency and comprehension scores tend to be high (Table 19). Some of the correlations across languages and across tasks are also high (not shown). The correlation between word recognition in English and fluency in Kiswahili is 0.92, while the correlation between word recognition in Kiswahili and fluency in English is 0.87. This suggests that skills correlate not only with each other, or that the same skills correlate across languages, but that skills correlate well with each other across languages.

Table 19: Student level correlations across languages

	With 0 scores	No 0 scores
Letter recognition (LR)	0.18	-0.17
Word recognition (WR)	0.84	0.72
Passage words (PR)	0.86	0.58
Comprehension score (CS)	0.61	0.18

Calculated by the EGR Kenya Report authors

3.4.2.2. School level correlations

Table 20 shows that the correlations for school-level performance across languages are similar to those for student-level correlations, but generally a little higher.

Table 20: School level correlations across languages

	With 0 scores	No 0 scores
Letter recognition (LR)	0.18	0.27
Word recognition (WR)	0.93	0.86
Passage words (PR)	0.96	0.85
Comprehension score (CS)	0.88	0.48

Calculated by the EGR Kenya Report authors

The fact that the correlations when including students with scores of 0 are so much higher than when excluding students with scores of 0 in both tables above suggests that there are many students whose score in both languages is zero, which reinforces the notion that those who can read in one language are also reading in the other, and that a lot of students are simply not reading at all, in either language, driving up the cross-language correlations. See Tables 21 and 22 for the number of students who could not perform at all across all tasks in both English and Kiswahili languages.

Table 21: Number of students who could not perform at all in Kiswahili (thus, students who scored 0)

	Freq.	Perc.
Letter recognition (LR)	526	66
Word recognition (WR)	274	34
Passage words (PR)	390	59
Comprehension score (CS)	674	84

Calculated by the EGR Kenya Report authors

Table 22: Number of students who could not perform at all in English (thus, students who scored 0)

	Freq.	Perc.
Letter recognition (LR)	156	20
Word recognition (WR)	379	47
Passage words (PR)	405	50
Comprehension score (CS)	659	82
Phoneme segmentation (PS)	221	28

Calculated by the EGR Kenya Report authors

3.5. Reliability Analysis for EGR - Kenya

The content validity of the EGRA instruments developed for Kenya has been checked through the expert inputs during the workshop in Mombasa in April 2007 as well as through subsequent consultations with local and international early grade experts. It seems to line up reasonably well with the Kenyan curricular statement, where most of the skills tested in EGRA are called for. (See section 3.7 below.) In this section, the internal consistency of the EGRA instruments has been tested using Cronbach analysis. The reader disinclined to delve into these technical issues can skip this section without problem. The main conclusion is that the EGRA instrument performs well in terms of traditional measures of reliability.

To assess the reliability of the instrument, we have carried out Cronbach tests of various versions and approaches of the instrument. The details are contained in Annex 5. The results of the analysis suggest that the EGRA tool as applied in Kenya is quite reliable. The most reliable “version” is when both languages are applied and the results are considered at school level. This has a reliability coefficient (Cronbach’s alpha) of 0.94—extremely high (Table 23). If one applies only one language the reliability drops considerably. For example, staying with school-level analysis, the reliability for English and Kiswahili individually drops from 0.94 when both languages are considered, to 0.88 and 0.90 respectively.

It is safe to conclude that reliability is maximized by including both languages, if for no other reason than there are more items and, also, because some students may be learning slightly better in one language than the other. It is also safe to conclude that, if one wants to hold to the highest standards, these assessments be used mostly to provide information about schools rather than individual students, particularly if only one language were to be used. In the case of individual students, and for single languages, the reliability score drops below the crucial threshold of 0.85. In the case of school-level judgments, the reliability score even in a single language is above the crucial 0.85 threshold, but it is best to assess in both languages, as the reliability score goes all the way up to 0.94. Some of the individual patterns are of interest. It is noteworthy, for example, that the item that most contributes to the reliability of the overall test is the most common-sensical and traditional one: fluency in connected text. This can be seen by noting (see Annex 5) that it is when this item is excluded that the overall reliability of the test goes down the most. This single item contributes significantly to the reliability of the test.

Table 23: Cronbach tests for all tasks in English and Kiswahili

	Student level	School level
Assessment using items from both languages with 0 scores included	0.91	0.94
Kiswahili with 0 scores included	0.83	0.90
English with 0 scores included	0.83	0.88

Calculated by the EGR Kenya Report authors

3.6. Ranking of treatment schools on all tasks

The above findings indicate that schools are not performing at an acceptable level (e.g., 45 correct words per minute) and while they all require carefully designed support, there are schools that are much worse off than others and as such may require a more structured approach, or the same approach but a more intensive intervention in teacher training and learning progress monitoring. In the tables presented below, the schools have been ranked and compared by their average scores for all of the tasks for Kiswahili and English (Table 24). The schools have also been ranked by the average score on all tasks across two languages (Table 25). For both of these rankings, variables including 0 scores were used, since the fact that so many students are completely unable to perform is clearly part of the school-level performance problem. Note that the range of performance in both languages is a striking 5 to 1 (to be conservative), or even worse if one takes the true extremes.

Table 24: Treatment school ranked by average scores on all tasks: comparisons English and Kiswahili

Kiswahili		English	
MASHEHENI	0.1	MONGOTINI	3.7
SHAKADULO	1.9	SHAKADULO	4.3
MONGOTINI	2.2	MASHEHENI	4.7
BARICHO	3	BOMANI	5.9
DAKACHA	3.0	KURAWA KANAGONI	6.5
KURAWA KANAGONI	3.8	GANDINI	7.0
GANDINI	4.0	BARICHO	7.1
BOMANI	4.1	NG'ANDU	7.4
NG'ANDU	5.0	BORESINGWAYA	7.5
VIRIKO	5.4	KAKUYUNI	8.2
BORESINGWAYA	5.5	YEMBE	9.3
KAKUYUNI	5.8	MAJEJENI	11.7
YEMBE	6.3	WARESA	11.7
NGOMENI	6.9	NGOMENI	11.7
MARAFI	7.1	DAKACHA	11.7
WARESA	7.3	VIRIKO	13.1
MAJEJENI	8.1	MARAFI	13.8
PISHIMWENGA	9.0	MAGARINI	16.3
MAGARINI	14.1	PISHIMWENGA	16.3
MAPIMO	17.4	MAPIMO	17.2

Calculated by the EGR Kenya Report authors

Table 25: Treatment school ranked by average scores on all tasks: English and Kiswahili combined

MASHEHENI	2.4
MONGOTINI	3.0
SHAKADULO	3.1
BOMANI	5.0
BARICHO	5.0
KURAWA KANAGONI	5.2
GANDINI	5.5
NG'ANDU	6.2
BORESINGWAYA	6.5
KAKUYUNI	7.0
DAKACHA	7.3
YEMBE	7.8
VIRIKO	9.2
NGOMENI	9.3
WARESA	9.5
MAJEJENI	9.9
MARAFI	10.4
PISHIMWENGA	12.7
MAGARINI	15.2
MAPIMO	17.3

Calculated by the EGR Kenya Report authors

3.7. Line-up of the results and the instrument with curricular standards in Kenya

In thinking about the reading tasks included in this EGRA assessment it may be wise to take a look at how it lines up with curricular standards or the syllabus in Kenya. Using for now the 2002 version (the only official version thus far, as we understand), the following can be noted.

The Kenyan syllabus or curriculum is admirably specific and detailed, compared to what unfortunately seems to have become fashionable in other countries (though the fashion is now often being reversed in many countries). Even as early as Standard 1, learners are expected to “recite and recognize the letters of the alphabet.” (Objective 1.2.a). The EGRA focuses on recognition and fluency, because ability to recite the letters, in sequence, and without visual cues, is not a very good predictor of later skills, whereas the ability to fluently recognize and name letters from a randomized list is a good way to assess letter recognition and naming skills.

By Standard 2 students are expected to “read simple sentences/passages related to greetings and polite language” (Objective 1.2.d) as well as a about colours (2.2.f), numbers (4.2.e), time (5.2.e), position and direction (6.2.e), home and home activities (7.2.e), shopping (8.2.c), their bodies (9.2.e), health and hygiene (10.2.c), travel (11.2.f), clothes (12.2.c), food (13.2.d), wild animals (14.2.c), weather (15.2.c), the farm (16.2.c.) and home equipment (17.2.c. and d.). In many of these cases, the student is also expected to “answer comprehension questions.” All this is what the EGRA does, but with a focus on fluency, as fluency needs to be specified if one is to be accurate about “reading.” If a student takes a minute to read a four word sentence, it is doubtful whether this can be called reading. When it comes to assessment methods that line up with the objectives, the syllabus (see, e.g., page 31) recommends oral (and silent) reading, and answering comprehension questions (among many others). Again, EGRA adds the notion of fluency to give some more specific meaning to the notion of “reading”.

Though EGRA was unable to assess skills in home languages, the intent of the syllabus in general, with regard to reading, is also clear in the home languages area, when it is noted that students even in Standard 1 are expected to “read and understand graded reading materials” (42.1.c). Interestingly, in this area, reading skills include naming the letters of the alphabet (which is what EGRA does, but note, again interestingly, that the emphasis on naming is found in the home language section of the syllabus, rather than the English section, even though as it appeared in the April 2007 workshop, naming conventions for non-English languages are not clear and names of letters tend not to be used or taught). In Standard 2 students are expected to read books, in home language (5.2.1.a). Interestingly, again, the concept of fluency which EGRA handles because of its acknowledged importance, is introduced in Kenya only in the context of home language, but is, oddly, not discussed when it comes to English. For example, Objective 5.2.1.e. refers to “read a range of materials with some independence, fluency, accuracy, and understanding.” Even in this case, however, no standard is chosen for fluency or accuracy. EGRA hopes to help by doing both, with the concept of cwpm, and this particular exercise begins to lay some benchmarks around this concept, albeit as part of a baseline for a specific project. It is hoped that more work will follow, in other geographical areas, with other socio-economic groups, and perhaps with home languages.

3.8. Should schools or students within schools be helped?

In determining how to allocate remediation resources, it is helpful to know whether schools or students should be targeted. In the section above, the implicit assumption is that some school-based targeting should be done. Even within the treatment group, some schools clearly do perform, on average, much worse than others, and thus a reasonable amount of effort should be targeted on a school basis.

The purpose of an eventual intervention should be not only to improve averages, but also to reduce variation. The results derived by EGRA show a very high degree of inequality of results. The reader disinclined to deal with technical issues surrounding the measurement of inequality can skip this section. Suffice it to say that the report finds a considerable amount of inequality of reading ability—more inequality on this score than there is inequality of parental income. The analysis also shows that a lot of the inequality is within schools, not between schools. Thus, teachers and monitors have to work to ensure that teachers are bringing along all students within schools.

A common index of inequality is the Gini coefficient, used frequently in calculating, for example, income inequality. If one applies the Gini coefficient to, say, fluency in passage reading in English, the Gini coefficient for this variable was a very high 0.70.¹⁰ Considering that the distribution of income in Kenya has a coefficient of 0.53, these results imply that reading ability is distributed more poorly (in the Malindi district) than the income of parents (in Kenya as a whole). This should be cause for concern. Thus, the task is not only to improve averages, but to reduce inequality. In that case the same concern arises: does one tackle inequality (and average skills) by trying to bring up the worst-performing schools, or by trying to bring up the worst-performing students within all schools?

Table 26: Breakdown of the sources of inequality

Indicator of inequality	Proportion of inequality or variability that is found between schools ¹¹
0-order entropy indicator	9%
Sum of squared errors	25%

Calculated by the EGR Kenya Report authors

As Table 26 shows, using two methods, the between-school variability or inequality is considerably less than 50% of the total variability. Another, perhaps more intuitive way to look at the same thing is to proceed as follows. We calculated the ratio of the standard deviation of each schools' scores to each schools mean score, for a within-school coefficient of variation. The average of the within-school coefficients of variation for all schools was 1.55. We then took the standard deviation of the schools' means, and the grand mean of all the schools' means, to calculate a coefficient of between-school variation. This turns out to be only 0.73. This tells us that between school variation is only half as big as within-school variation. These numbers are not additive, so we cannot say, using this simple method, that a certain percentage of the variation is between schools. But we can say that within-school variation seems to be twice as large as between-school variation.

¹⁰ One would be loosely considering cwpm as a form of "income" or "wealth." A value of 0 implies total equality, a value of 1 implies total inequality. In the case of income, a value of 0 means that all families (or persons) in the society have the same income, a value of 1 means that one family (or person) has all the income. A value of 0.70 means a lot of inequality.

¹¹ Implicitly, then, the rest of the inequality or variability is found within schools.

All of this suggests that focusing on students that are falling behind within schools should be an important part of the strategy, and that focusing only on poorly-performing schools as a whole would be a relatively weaker way to reduce inequality. Since resources are always constrained, a wise strategy seems to be to make a special effort with the weaker students in the weaker schools. Or, that is, to make a special effort ensuring that there are fewer students with absolutely dismal performance in the poorer schools.

3.9. Implications for ongoing monitoring

The results of the EGRA evaluation suggest that for ongoing monitoring at school level, samples sizes of 20 per school are not large enough if one is trying to compare averages over time, school by school, to see how much schools are improving. Instead, other techniques such as Lot Quality Assurance Sampling will have to be used with sample sizes of 20 simply to see whether, and which, schools are improving. A sample size of 400, however, taking all intervention schools as a whole, will be sufficient to ascertain how much progress all the intervention schools as a whole will have made. Target levels of reading ability will have to be determined, and random samples of 20 students per school monitored with reading passages. A discussion of how this can be accomplished was presented at the RTI-provided training on 26th November to 1 December 2007 at Malindi. Further information was provided in handouts and exercises, and yet further information can be provided. The choice of standards or targets was also extensively discussed.

4. Appendices

4.1. Annex 1: English and Kiswahili Instruments

English Instrument

General Instructions

It is important to establish a playful and relaxed rapport with the students to be assessed, via some simple initial conversation among topics of interest to the student. The student should perceive the following assessment almost as a game to be enjoyed rather than a severe situation. It is important to read **ONLY** the sections in bold aloud slowly and clearly. If the student does not understand the instructions, explain them in the student's home language. After you have finished the interview, thank the student for their time and effort and give him/her a pencil.

Verbal Consent

My name is _____. I work with the Ministry of Education.

- We are trying to understand how students learn to read. You were picked by chance, like in a raffle.
- We would like your help in this. But you do not have to take part if you do not want to.
- We are going to play a reading game. I am going to ask you to read letters, words and a short story out loud.
- Using this stopwatch, I will see how long it takes you to read.
- This is **NOT** a test and it will not affect your grade at school.
- I will also ask you questions about your family, like what language your family uses at home and some of the things your family has.
- I will **NOT** write down your name so no one will know these are your answers.
- Once again, you do not have to participate if you do not wish to. Once we begin, if you would rather not answer a question, that's all right.
- Can we get started?

Verbal Consent Obtained. YES _____ NO _____ [Stop Assessment, Get Another Student]

Start and Stop Time (Hour and Minutes): ____: ____ to ____: ____

Section 1: Background information

1. Questionnaire ID: _____
2. Administrator's name: _____
3. Division: _____
4. Zone: _____
5. School name: _____
6. Name of student: _____
7. Class: _____
8. Age: _____
9. Gender: _____
10. Did you go to any nursery/pre-school: _____
11. What language do you mostly speak at home? _____
12. Who helps you with school work at home? _____
13. What materials do you read at home?: _____
14. Do you watch TV at home? _____
15. Do you listen to radio at home? _____

Section 2 Marking Sheet: Letter recognition

Give the sheet of paper with written letters on it and then follow with instructions as shown below.
The assessor will say:

"Look at the letters written on your paper. Read them aloud starting from here. Read as fast as you can."

For example, the name of this letter [point to O] is "OH".

Now You Try: Tell me the name of this letter [Have the Student Identify the Letter "V"]:
If the student responds correctly say: Good, the name of this letter is "VEE."
If the student does not respond correctly, say: The name of this letter is "VEE."

Now You Try: Tell me the name of this letter [Have the Student Identify the Letter "L"]:
If the student responds correctly say: Good, the name of this letter is "ELL."
If the student does not respond correctly, say: The name of this letter is "ELL."

If you don't know a letter go on to the next one. I will tell you when to start and when to stop.

Get ready.

Start."

or

"Angalia herufi zilioko kwa karatasi yako. Kama hujui kusoma, soma herufi ifuatayo. Jitayarisha kusoma. Nitakuambia wakati wa kuanza na wakati wa kuacha kusoma. Soma herufi hizi kwa sauti ya juu kwanza hapa. Sasa anza kusoma."

Mark the letters incorrectly recognized and read with a slash (/).
At one minute, mark the last letter read with a ()

V	L	H	G	S	Y	Z	W	L	N	/10
L	K	T	D	K	T	Q	D	Z	W	/20
H	W	Z	M	U	R	J	G	X	U	/30
G	R	B	Q	I	F	I	Z	S	R	/40
S	N	C	B	P	Y	F	C	A	E	/50
Y	S	Q	P	M	V	O	T	N	P	/60
Z	A	E	X	F	F	H	U	A	T	/70
W	G	H	B	S	L	G	M	I	I	/80
L	L	O	O	X	N	E	Y	P	X	/90
N	K	C	D	D	Y	B	J	R	V	/100
V	M	W	Q	V	L	H	G	S	Y	/110

Start the timer when you say "begin." Follow along with your pencil and mark any incorrect or omitted letters with a slash (/). Count self-corrections as correct. Stay quiet, except when providing answers as follows: if the student hesitates for 3 seconds, provide the name of the letter, point to the next letter and say "Please go on." Mark the letter you provided to the student as incorrect. AFTER 60 SECONDS SAY, "stop." Mark the final letter read before you said "stop" with a bracket (]).

Total letters read at 60 seconds: (use the counter to the right, above, to help you): _____ Total incorrect letters at 60 seconds: _____ Total correct letters at 60 seconds: _____ ONLY IF LESS THAN 60 seconds, number of seconds at completion: _____

Section 2 Marking sheet: Word recognition

Give the sheet of paper with written words on it and then follow with instructions as shown below.
The assessor will say:

"Look at the words written on your paper. Read them aloud starting from here. Read as fast as you can."

For example, this word [point to "pot" below] is "pot."

Now You Try: Read me this word [Have the student identify the word "bell."]:

If the student responds correctly say: Good, the word is "bell."

If the student does not respond correctly, say: This word is "bell."

If you don't know a word, go on to the next one. I will tell you when to start and when to stop. Get ready. Start."

Examples: pot bell

sad dog red do eat fire	/6
and us to girl then he	/12
as hat if seem get too	/18
house sun stop lots ear pencil	/24
food at they big the some	/30
last run fly we on our	/36
saw walk school best time cow	/42
boy wall chair all me good	/48
will blue size fall go ride	/54
hope far an her was fun	/60

Start the timer when you say "begin." Follow along with your pencil and mark any incorrect or omitted letters with a slash (/). Count self-corrections as correct. Stay quiet, except when providing answers as follows: if the student hesitates for 3 seconds, provide the word, point to the next word and say "Please go on." Mark the word you provided to the student as incorrect. AFTER 60 SECONDS SAY, "stop." Mark the final word read before you said "stop" with a bracket (]).

Total words read at 60 seconds (use the counter to the right, above, to help you): _____
Total incorrect words at 60 seconds: _____
Total correct words at 60 seconds: _____
ONLY IF LESS THAN 60 seconds, number of seconds at completion: _____

Section 4 Marking Sheet: Passage Reading

Instructions: Give a sheet of paper with the passage to the pupil and then follow with instructions as shown below. The assessor will say:

"I am going to ask you to read aloud the passage written on your paper and then, I will ask you some questions on it. Read as fast as you can. Ready. Start (start the stop-watch as soon as you say 'start')"

Or

"Hiki ni kifungu cha ufahamu. Ningependa usome kwa sauti ya juu kisha ujibu maswali nitakayokuuliza. Jitayarisha kusoma. Anza sasa."

Section 4 Marking Sheet: passage reading

Instructions

1. Stop the student at one minute, unless they only have one sentence left.
2. Put a "]" mark after the last word read at the one minute mark.
3. Note the following:
 - Mark incorrect words with a slash.
 - Mark words omitted with a slash.
 - Do not count words repeated/inserted.
4. If the student finishes up to "gave the dog a big bone," let the student finish, but make sure you mark the actual time taken, in seconds.

Passage

Kazungu had a little dog. The little dog was	9
fat. One day Kazungu and the dog went out	18
to play. The little dog got lost. But after	27
a while the dog came back. Kazungu took	35
the dog home. When they got home	42
Kazungu gave the dog a big bone. The little	51
dog was happy so he slept. Kazungu also	59
went to sleep.	62

Start the timer when you say "begin." Follow along with your pencil and mark any incorrect or omitted words with a slash (/). Count self-corrections as correct. Stay quiet, except when providing answers as follows: if the student hesitates for 3 seconds, provide the word, point to the next letter and say "Please go on." Mark the word you provided to the student as incorrect. AFTER 60 SECONDS SAY, "stop." Mark the final letter read before you said "stop" with a bracket (]).

Total words read at 60 seconds (use the counter to the right, above, to help you): _____
Total incorrect letters at 60 seconds: _____
Total correct letters at 60 seconds: _____
If less than 60 seconds, or if you allowed the student to go on past 60 seconds, enter
number of seconds at completion: _____

Comprehension Questions

Instructions: After the pupil has read the passage, you take away the passage sheet before asking the questions. Translate the question(s) into Kiswahili for the pupil if s/he shows hesitation.

The Assessor will say: "Now I am going to ask you a few questions about the story you have just read. Try to answer the questions as best you can"

"Sasa ningependa kukuuliza maswali kuhusu habari ambayo umesoma. Jaribu kujibu haya maswali kadiri ya uwezo wako."

(For every right answer give one mark. The answers provided are to facilitate quick marking. Just tick the answers that were correct.)

The assessor will ask the questions below:	correct answer
1. Who had a dog?	Kazungu
2. Was the dog big or little?	Little
3. Was the dog thin or fat?	Fat
4. Where did Kazungu take the dog?	Home
5. Why was the dog happy?	He was given a big bone

Section 5: Phoneme Segmentation.

Instructions: There is no student sheet for this, as they read nothing. They only listen to the word the assessor reads. The assessor will say:

"I am going to say a word. After I say it, tell me all the sounds in the word. If I say "Hen" you would then say / h / e / n /? Now you try it. Let's another word "hat". Tell me the sounds in "hat".

If the student responds correctly say: Very good, the sounds in "hat" are /h/ /a/ /t/.

If the student does not respond correctly, say: The sounds in "hat" are /h/ /a/ /t/. Now tell me the sounds in "hat". Make sure the student understands the instructions if necessary translate in Kiswahili.

The student should be allowed two minutes to finish as many items as possible. Pronounce the word twice. Allow 10 seconds for the student to respond. Provide the

number and sounds of the words, mark it incorrect and move on. Score both the number of sounds (correct / incorrect).

Section 5 Marking Sheet: Phoneme Segmentation

Put a slash (/) through incorrectly said phonemes

shop	/sh/ /o/ /p/	____/3
stand	/s/ / t/ /a/ /n/ /d/	____/5
thank	/th/ /a/ /ng/ /k/	____/4
bat	/b/ /a/ /t/	____/3
seen	/s/ /ea/ /n/	____/3
should	/sh/ /uu/ /d/	____/3
up	/u/ /p/	____/2
at	/a/ /t/	____/2
top	/t/ /o/ /p/	____/3
if	/i/ /f/	____/2

Count and write down the total number of correctly pronounced Phonemes _____

Student Sheets for English: These were handed out to students during the assessments. The font used for the handouts was Arial 20.

V L H G S Y Z W L N

L K T D K T Q D Z W

H W Z M U R J G X U

G R B Q I F I Z S R

S N C B P Y F C A E

Y S Q P M V O T N P

Z A E X F F H U A T

W G H B S L G M I I

L L O O X N E Y P X

N K C D D Y B J R V

V M W Q V L H G S Y

Examples: pot bell

sad dog red do eat fire

and us to girl then he

as hat if seem get too

house sun stop lots ear pencil

food at they big the some

last run fly we on our

saw walk school best time cow

boy wall chair all me good

will blue size fall go ride

hope far man her was fun

Kazungu had a little dog. The little dog was fat. One day Kazungu and the dog went out to play. The little dog got lost. But after a while the dog came back. Kazungu took the dog home. When they got home kazungu gave the dog a big bone. The little dog was happy so he slept. Kazungu also went to sleep.

Kiswahili Instrument

SEHEMU YA KWANZA

Division..... Zone.....

1. Shule: _____
2. Darasa: _____
3. Jina la Mwanafunzi _____
4. Umri: _____
5. Jinsia : (Msichana / Mvulana) _____
6. Ulienda shule ya Nasari: _____
7. Nyumbani mwatumia lugha gani: _____
8. Nani hukusaidia kufanya kazi ya shuleni ukiwa nyumbani? _____
9. Wewe husoma vitabu vyovyote au magazeti ukiwa nyumbani? _____
10. Kuna TV ama Runinga nyumbani kwenu? _____
11. Na radio je? _____

Sehemu ya Pili: Kutambua Herufi

Maagizo kwa Mhojaji: Onyesha mwanafunzi chati ya herufi kisha useme: " Katika ukurasa huu kuna herufi ningependa uzisome. Tamka herufi hizi kwa njia bora uwezavyo. Tutaanzia hapa."

Tia alama kama / kwa kila herufi ambayo haikutambuliwa vizuri. Baada ya mwanafunzi kusoma kwa muda wa dakika moja weka alama] mahali ambapo atakuwa ameachia.

"Angalia herufi zilioko kwa karatasi yako. Kama hujui kusoma, soma herufi ifuatayo..Soma herufi hizi kwa sauti ya juu kwanzia hapa. Jitayarishe kusoma.Sasa anza kusoma."

v	l	h	g	s	y	z	w	l	n	/10
l	k	t	d	k	t	g	dh	z	w	/10
h	w	z	m	u	r	j	g	w	u	/10
gh	r	b	h	i	f	j	z	s	r	/10
s	n	ch	b	p	y	f	ch	a	e	/10
y	sh	r	p	m	v	o	t	ny	p	/10
z	a	e	m	f	f	h	u	a	t	/10
w	g	h	b	sh	l	g	mw	i	i	/10
l	l	o	o	ng'	n	e	y	p	ch	/10
n	k	ch	d	dh	y	b	j	r	v	/10
v	mw	w	h	v	l	h	gh	s	y	/10

Andika idadi ya herufi zilizosomwa sawasawa: _____

Andika idadi ya herufi zote zilizosomwa: _____

Iwapo mwanafunzi alitumia muda usiozidi dakika moja, onyesha huo muda aliotumia _____

Sehemu ya Tatu: Kutambua Maneno

Maagizo Kwa Mhojaji: Onyesha mwanafunzi chati ya maneno kisha useme: "Hapa kuna orodha ya maneno ambayo ningependa usome kadiri ya uwezo wako. Jitayarisha kusoma. Sasa anza kusoma. Tutaanzia hapa.

Ikiwa mwanafunzi hatacoma maneno ya mstari wa kwanza mwachisha kusoma.

ana	baba	kuku	taka	paka	/5
jino	mbuzi	kiatu	lala	moto	/5
maji	chatu	gari	jicho	povu	/5
kula	kiti	vuna	uji	panya	/5
ama	zaa	ua	nyuki	mpira	/5
meza	sakafu	hisi	kikombe	meno	/5
kiko	saa	ghala	nyumba	kucha	/5
ng'ombe	mlango	samaki	shati	bibi	/5
riba	kalamu	chaki	shule	chaki	/5
dada	kaka	mende	nyasi	nywele	/5

Andika idadi ya herufi yaliyosomwa sawasawa: _____

Andika idadi ya herufi zote yaliyosomwa: _____

Iwapo mwanafunzi alitumia muda usiozidi dakika moja, onyesha muda aliotumia _____

Sehemu ya Nne: Ufahamu

Maagizo Kwa Mhojaji: Mwambie mwanafunzi asome kifungu kifuatacho kwa sauti, na akadirie wakati atakaotumia kusoma. “Soma kifungu kifuatacho Kwa sauti, kadiri ya uwezo wako. Kisha ujibu maswali nitakayokuuliza. Jitayarishe. Tutaanzia hapa.

Jumamosi iliyopita Katana na dada zake, Kadzo na Fatuma,	9
walienda kuogelea baharini. Kabla ya kuondoka walibeba	16
mahamri, maembe, samaki na maji ya machungwa. Walibeba	24
pia nguo zao za kuogelea. Wote waliingia kwenye	32
matatu kuelekea huko. Walipofika baharini waliona watu	39
wengi sana. Katana alikuwa na hamu sana ya kuogelea. Maskini	49
Katana, aliingia baharini bila kubadili nguo zake! Dada	57
zake walimcheka sana.	60

Kumbuka: Iwapo mwanafunzi amesoma chini ya nusu ya kifungu, usimwulize maswali ya ufahamu.

Mweleze mwanafunzi, “Nitakuuliza maswali kuhusu habari ambayo umesoma. Jaribu kujibu maswali kadiri uwezavyo” .

Maswali

1. Katana na dada zake walienda wapi
2. Taja majina ya dada zake Katana?
3. Je walibeba sambusa?
4. Waliona nini baharini?
5. Kwanini dada zake Katana walimcheka?

Majibu

Baharini kuogelea
Kadzo na Fatuma
La, walibeba mahamri, maembe,
samaki na maji ya machungwa.
Watu wengi sana.
Kwa sababu aliingia baharini bila
kubadili nguo zake

Student Sheets for Kiswahili: These were handed out to students during the assessments. The font used for the handouts was Arial 20.

v l h g s y z w l n
 l k t d k t g dh z w
 h w z m u r j g w u
 gh r b h i f j z s r
 s n ch b p y f ch a e
 y sh r p m v o t ny p
 z a e m f f h u a t
 w g h b sh l g mw i i
 l l o o ng' n e y p ch
 n k ch d dh y b j r v
 v mw w h v l h gh s y

ana baba kuku taka paka
 jino mbuzi kiatu lala moto
 maji chatu gari jicho povu
 kula kiti vuna uji panya
 ama zaa ua nyuki mpira
 meza sakafu hisi kikombe meno
 kiko saa ghala nyumba kucha
 ng'ombe mlango samaki shati bibi
 riba kalamu chaki shule chaki
 dada kaka mende nyasi nywele

Jumamosi iliyopita Katana na dada zake, Kadzo na Fatuma,

walienda kuogelea baharini. Kabla ya kuondoka walibeba

mahamri, maembe, samaki na maji ya machungwa.

Walibeba pia nguo zao za kuogelea. Wote waliingia kwenye

matatu kuelekea huko. Walipofika baharini waliona watu
wengi sana. Katana alikuwa na hamu sana ya kuogelea.
Maskini Katana, aliingia baharini bila kubadili nguo zake!
Dada zake walimcheka sana.

4.2. Annex 2: District ranking by poverty levels

Table 27: Districts ranked by poverty levels

1	Turkana	93.3	41	Laikipia	47.0
2	Marsabit	89.8	42	Lugari	46.9
3	Mandera	86.6	43	Nyamira	46.8
4	Wajir	84.7	44	Nandi North	46.6
5	Samburu	78.3	45	Nandi South	46.6
6	Tana River	75.2	46	Keiyo	45.5
7	Kwale	72.6	47	Uasin Gishu	44.0
8	Busia	68.6	48	Eldoret Municipality	44.0
9	Malindi	67.9	49	Homa Bay	43.9
10	West Pokot	67.8	50	Kisumu	43.6
11	Gucha	66.8	51	Kisumu Municipality	43.6
12	Marakwet	66.4	52	Migori	42.1
13	Kilifi	65.0	53	Nakuru	41.0
14	Makueni	63.9	54	Nakuru Municipality	41.0
15	Kitui	62.9	55	Kericho	40.8
16	Isiolo	62.5	56	Vihiga	40.4
17	Moyale	61.1	57	Rachuonyo	40.0
18	Mwingi	60.9	58	Siaya	40.0
19	Baringo	60.1	59	Mombasa	37.6
20	Kuria	59.1	60	Embu	35.9
21	Bomet	58.5	61	Buret	32.8
22	Teso	58.2	62	Thika	32.7
23	Mt Elgon	58.0	63	Thika Municipality	32.7
24	Koibatek	56.4	64	Lamu	31.6
25	Machakos	56.1	65	Meru South	31.3
26	Taita Taveta	55.0	66	Maragua	31.1
27	Garissa	55.0	67	Nyeri	31.0
28	Ijara	55.0	68	Meru North	29.6
29	Kakamega	52.7	69	Muranga	28.7
30	Butere/Mumias	51.8	70	Narok	27.3
31	Suba	51.2	71	Bondo	26.0
32	Trans Mara	51.2	72	Kirinyaga	25.2
33	Bungoma	50.3	73	Meru Central	23.9
34	Mbeere	49.9	74	Nairobi	21.3
35	Kisii	49.8	75	Kiambu	21.2
36	Trans Nzoia	49.4	76	Kajiado	11.9
37	Kitale Municipality	49.4			
38	Nyandarua	49.2			
39	Tharaka	48.9			
40	Nyando	48.8			

Calculated by the EGR Kenya Report authors

Table 28: Coastal districts ranking by poverty levels

1	Tana River	75.2
2	Kwale	72.6
3	Malindi	67.9
4	Kilifi	65.0
5	Taita Taveta	55.0
6	Mombasa	37.6
7	Lamu	31.6

Calculated by the EGR Kenya Report authors

4.3. Annex 3: Summary statistics for all schools for all tasks

Table 29: Table Summary: means and standard deviations for all tasks with 0 scores

Kiswahili	Mean	Std. Dev	Min	Max
K. Letter recognition (LR)	4.7	10.8	0	78
K. Word recognition (WR)	11.7	13.7	0	50
K. Passage words	10.2	14	0	60
K. Comprehension score	0.4	1.1	0	5
English	Mean	Std. Dev	Min	Max
Letter recognition (LR)	22.7	19.9	0	100
Word recognition (WR)	7.5	11.5	0	58
Passage words (PR)	11.4	16.2	0	62
Comprehension score (CS)	0.4	1	0	4
Phoneme segmentation (PS)	11.5	9.5	0	30

Calculated by the EGR Kenya Report authors

Table 30: Table Summary: means and standard deviations for all tasks NO 0 scores

Kiswahili	Mean	Std. Dev	Min	Max
K. Letter recognition (LR)	13.6	14.8	0	78
K. Word recognition (WR)	17.7	13.4	1	50
K. Passage words	19.7	13.9	0	60
K. Comprehension score	2.8	1	0	5
English	Mean	Std. Dev	Min	Max
Letter recognition (LR)	27.7	18.6	0	100
Word recognition (WR)	14.2	12.6	1	58
Passage words (PR)	22.7	16.4	0	62
Comprehension score (CS)	1.8	1.3	0	4
Phoneme segmentation (PS)	15.9	7.5	1	30

Calculated by the EGR Kenya Report authors

4.4. Annex 4: Correlations: student background questions and performance on all tasks

Table 31: Correlations: student background questions and performance on all tasks

	Pre-school		Homework		Reading material		TV		Radio	
	0 scores	No 0 scores	0 scores	No 0 scores	0 scores	No 0 scores	0 scores	No 0 scores	0 scores	No 0 scores
K. Letter recognition	-0.01	0.17	-0.01	-0.09	-0.09	-0.05	-0.06	-0.20	-0.02	-0.30
K. Word recognition	-0.06	-0.23	0.00	0.02	-0.14	0.14	-0.05	0.06	0.02	0.01
K. Passage words	-0.06	0.23	0.01	0.05	-0.14	0.01	-0.03	-0.02	0.00	-0.15
K. Comprehension score	-0.07	0.04	0.03	-0.11	-0.07	0.06	-0.05	0.07	-0.03	-0.05
Letter recognition	-0.06	-0.13	0.03	-0.25	-0.08	0.00	-0.01	-0.19	0.00	-0.05
Word recognition	-0.08	-0.01	-0.02	0.00	-0.11	0.00	-0.06	-0.09	0.01	-0.09
Passage words	-0.07	0.13	-0.04	0.06	-0.13	0.11	-0.05	-0.14	0.02	-0.20
Comprehension score	-0.07	0.08	-0.04	-0.09	-0.11	-0.08	-0.08	-0.18	0.01	0.05
Phoneme segmentation	-0.03	0.14	-0.07	-0.40	-0.03	0.02	0.06	-0.07	0.04	-0.03

Calculated by the EGR Kenya Report authors

4.5. Annex 5: Reliability Analysis for EGR – Kenya (individual and school level tests)

The following set of tables shows the reliability analyses for various “cuts” on the tools. In each table, the first column with correlations (the fourth table column), labelled “item-test correlation” measures the correlation between the item and the whole test, i.e., the full set of items. The second column, labelled “item-rest correlation” measures the correlation between a particular item and the rest of the test (i.e., all other items taken together except the one in the relevant row). The third column, labelled “average inter-item correlation” is the average inter-item correlation excluding the item in the relevant row. The fourth column gives Cronbach’s alpha for all items but the item in the row, and then for the whole test. This allows one to see which items tend to improve the reliability of the overall tool.

Only results that include all students, i.e., those scoring zero on particular items, are shown, as it does not make sense to calculate the reliability by arbitrarily excluding those whose performance was zero.

A. Individual (student) level tests

Table 32: Student level Cronbach test for all tasks in English and Kiswahili with 0 scores

Test scale = mean(standardized items)

Item	Obs	Sign	item-test correlation	item-rest correlation	inter-item correlation	alpha
K. Letter recognition	800	+	0.48	0.36	0.58	0.92
K. Word recognition	800	+	0.91	0.87	0.48	0.88
K. Passage words	798	+	0.92	0.89	0.47	0.88
K. Comprehension score	799	+	0.79	0.72	0.51	0.89
Letter recognition	800	+	0.71	0.63	0.52	0.90
Word recognition	800	+	0.91	0.88	0.48	0.88
Passage words	800	+	0.92	0.90	0.47	0.88
Comprehension score	800	+	0.75	0.68	0.51	0.89
Phoneme segmentation	800	+	0.39	0.26	0.60	0.92
Test scale					0.51	0.91

Calculated by the EGR Kenya Report authors

Table 33: Student level Cronbach test for all tasks in Kiswahili with 0 scores

Test scale = mean(standardized items)

Item	Obs	Sign	item-test correlation	item-rest correlation	inter-item correlation	alpha
K. Letter recognition	800	+	0.59	0.33	0.80	0.92
K. Word recognition	800	+	0.90	0.81	0.46	0.72
K. Passage words	798	+	0.94	0.88	0.42	0.69
K. Comprehension score	799	+	0.84	0.70	0.53	0.77
Test scale					0.55	0.83

Calculated by the EGR Kenya Report authors

Table 34: Student level Cronbach test for all tasks in English with 0 scores

Test scale = mean(standardized items)

Item	Obs	Sign	item-test correlation	item-rest correlation	inter-item correlation	alpha
Letter recognition	800	+	0.78	0.63	0.48	0.79
Word recognition	800	+	0.91	0.84	0.40	0.73
Passage words	800	+	0.91	0.85	0.39	0.72
Comprehension score	800	+	0.78	0.63	0.48	0.79
Phoneme segmentation	800	+	0.47	0.23	0.68	0.89
Test scale					0.49	0.83

Calculated by the EGR Kenya Report authors

B. School- level tests

Table 35: School level Cronbach test for all tasks in English and Kiswahili with 0 scores
Test scale = mean(standardized items)

Item	Obs	Sign	item-test correlation	item-rest correlation	inter-item correlation	alpha
K. Letter recognition	40	+	0.58	0.48	0.71	0.95
K. Word recognition	40	+	0.96	0.94	0.61	0.93
K. Passage words	40	+	0.97	0.96	0.60	0.92
K. Comprehension score	40	+	0.90	0.87	0.62	0.93
Letter recognition	40	+	0.78	0.72	0.65	0.94
Word recognition	40	+	0.95	0.94	0.61	0.93
Passage words	41	+	0.96	0.95	0.60	0.92
Comprehension score	40	+	0.87	0.83	0.63	0.93
Phoneme segmentation	40	+	0.45	0.33	0.74	0.96
Test scale					0.64	0.94

Calculated by the EGR Kenya Report authors

Table 36: School level Cronbach test for all tasks in Kiswahili with 0 scores
Test scale = mean(standardized items)

Item	Obs	Sign	item-test correlation	item-rest correlation	inter-item correlation	alpha
K. Letter recognition	40	+	0.69	0.49	0.89	0.96
K. Word recognition	40	+	0.94	0.88	0.61	0.82
K. Passage words	40	+	0.97	0.94	0.58	0.80
K. Comprehension score	40	+	0.90	0.81	0.66	0.85
Test scale					0.68	0.90

Calculated by the EGR Kenya Report authors

Table 37: School level Cronbach test for all tasks in English with 0 scores
Test scale = mean(standardized items)

Item	Obs	Sign	item-test correlation	item-rest correlation	inter-item correlation	alpha
Letter recognition	40	+	0.84	0.74	0.57	0.84
Word recognition	40	+	0.96	0.92	0.49	0.80
Passage words	41	+	0.96	0.93	0.49	0.80
Comprehension score	40	+	0.85	0.76	0.56	0.84
Phoneme segmentation	40	+	0.48	0.27	0.82	0.95
Test scale					0.59	0.88

Calculated by the EGR Kenya Report authors

4.6. Annex 6: Kenya Education Staff Institute (KESI) Inputs: findings and lessons learned from the baseline survey

Findings

i) Teacher/pupil ratio

The table below reveals that the teachers are overburdened because all the schools had a teacher/pupil ratio that is above the official ratio of 1:40. The above situation is even worse for Lower Primary School Teachers. For example, in Majenjeni Primary School, Standard 2 has a teacher/pupils ratio of 1:60, Masheheni Standard 1 Class has a population of 132 with three streams handled by one teacher (1:83).

Table 38: Teacher: Student ratio in schools visited by KESI

School	Enrolment	Number of Teachers	Teacher/Pupils Ratio
1. Sabaki Primary	1,006	17	1:60
2. Majenjeni Primary	734	14	1:53
3. Mapimo Primary	1,934	35	1:56
4. Airport Primary	392	13	1:30
5. Masheheni Primary	867	12	1:59
6. Marafa Primary	1,260	26	1:49

Source: KESI Staff

ii) Infrastructural Development

In all the schools visited there was a problem with school infrastructure. In some schools, some classes were having lessons under a tree. In all of the schools except one, they had no fence, doors, windows or adequate classrooms. This really inconvenienced language teachers in the sense that they could not be able to mount teaching aids in the classes.

iii) Books/pupil ratio

Most of the schools have reached ratios of 3:1 and 2:1 for lower and upper primary classes respectively. This shows the government's effort to ensure that quality of education has not been compromised, at least in terms of books, as a result of large enrollments due to free primary education.

iv) ECDE background

Most of the pupils (over 90 %) had gone through ECDE schools.

v) Fluency in languages

Most of the pupils were not fluent in English though they were better in Kiswahili. However, a number were not comfortable with their Mjikenda languages which were not being taught because there were no text books

Recommendations

In view of early grade reading as a means of assessing quality of education, the team observed that there are also other factors which can enhance quality.

- (i) There is need to improve on the physical infrastructure of the schools in terms of classrooms. A good classroom environment can also enhance reading especially in terms of "talking- walls" for lower primary pupils.

- (ii) The books/pupil ratio of 3:1 for lower primary classes hinders effective reading. Though there has been a good effort by the government, lower primary school teachers observed that students read best when a book is directly in front of them. The current situation of three pupils sharing a book is more beneficial to the pupils who sit in between.
- (iii) There is need to construct enough classrooms in the schools especially for lower primary classes. Learning outside the classrooms in some schools did not offer a conducive environment for teaching-learning interactions.
- (iv) There is a need to provide in-service training to teachers especially for lower primary classes on how to handle larger classes and latest trends on pedagogical practices

Conclusion

The EGR Baseline Survey Training boosted the capacity of the four KESI's staff trainers on how to conduct Enumerator Training and implement a survey of this nature. The knowledge gained and best practices acquired from interacting with RTI, EADEC and Prof. Bali (the leading trainer) will be put in practice for the benefit of the Institute. The survey has also underscored the importance of EGR as a means of assessing quality. It is the hope of KESI that the findings of this study will be applied throughout Kenya. KESI will still remain at the forefront to fulfill its mandate of capacity building in line with the findings of EGRA.

4.7. Annex 7: Treatment and control schools details

Table 39: Treatment schools

	Name of school	District	Division	Zone	Replacements
		Malindi	Magarini	Magarini	
1	Kurawa Kanagoni	163	16301	1630101	
2	Masheheni		16301	1630101	
3	Majenjeni		16301	1630101	
4	Mapimo		16301	1630101	
5	Ngomeni		16301	1630101	
6	Bomani		16301	1630101	
7	Magarini		16301	1630101	
8	Mugumoni		Marafa	Garashi	Baricho
9	Kayagamra		16302	1630201	Dakacha
10	Garashi		16302	1630201	Shakadulo
11	Singwaya		16302	1630201	
12	Ng'andu		Marafa	Marafa	
13	Waresa		16302	1630202	
14	Marafa		16302	1630202	
15	Timboni		Malindi	Kakoneni	Boresingwaya
16	Gandini		16303	1630301	
17	Yembe		16303	1630301	
18	Girimacha		16303	1630301	Pishimwenga
19	Matolani		16303	1630301	Viriko
20	Mongotini		16303	1630301	

Table 40: Control schools

	Name of school	District	Division	Zone	Replacements
		Malindi	Magarini	Magarini	
1	Kambi ya Waya	163	16301	1630101	
2	Majahazini		16301	1630101	
3	Midodoni		16301	1630101	
4	Marikebuni		16301	1630101	
5	Boyani		16301	1630101	
6	Bahati		Malindi	Kakoneni	
7	Jilore		16303	1630301	
8	Malanga		16303	1630301	
9	Sosobora		16303	1630301	
10	Kakoneni		16303	1630301	
11	Jimba Gede		Malindi	Watamu	
12	Baguo		16303	1630302	
13	Mzizima		16303	1630302	
14	Msabaha		16303	1630302	

	Dongo				
15	Kundu		16303	1630302	
16	Airport		Malindi	Central	
17	Ganda		16303	1630303	
18	Central		16303	1630303	Kakuyuni
19	Malindi		16303	1630303	
20	Sabaki		16303	1630303	