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EGRA FRAMEWORK

Toolkit for the Early-Grade Reading Assessment Adapted for Zambia

2019 Updated Version

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EGRA FRAMEWORK

Toolkit for the Early-Grade Reading Assessment Adapted for Zambia

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ABBREVIATIONS

ASER	Pratham’s Annual Status of Education Report assessment
CONFEMEN	Conférence des Ministres de l'Éducation des Pays ayant le Français en Partage
CTT	classical test theory
DIBELS	Dynamic Indicators of Basic Early Literacy Skills
DFID	UK Department for International Development
ECZ	Examinations Council of Zambia
EDC	Education Development Center, Inc.
EFA	Education for All
EGMA	Early-Grade Mathematics Assessment
EGRA	Early-Grade Reading Assessment
EMIS	Education Management Information System
GPC	Grapheme-phoneme Correspondence
GPS	Global positioning system
ICC	Intra-class Correlation Coefficient
ID	Identification
IPA	International Phonetic Alphabet
IRR	Interrater Reliability
IRT	Item Response Theory
ISO	International Organization for Standardization
LCD	Liquid-Crystal Display
LLC	Limited-Liability Company
LLECE	Laboratorio Latinoamericano de Evaluación de la Calidad de la Educación
LQAS	Lot Quality Assurance Sampling
MDG	Millennium Development Goal
MoGE	Ministry of General Education (Zambia)
MSI	Management Systems International
NAS	National Assessment Survey (Zambia)
NACFL	National Center for Family Literacy
NICHDUS	National Institute for Child Health and Human Development
OLS	Ordinary Least Squares
ORF	Oral Reading Fluency
PASEC	Programme d'Analyse des Systèmes Educatifs de la CONFEMEN
PIRLS	Progress in International Reading Literacy Study

PISA	Programme for International Student Assessment
PPS	probability Proportional to size
PRIMR	Primary Math and Reading Initiative, Kenya
QCO	Quality Control Officer
RTI	RTI International
RTS	Read to Succeed
SACMEQ	Southern and Eastern Africa Consortium for Monitoring Educational Quality
TIMSS	Trends in International Mathematics and Science Study
TTL	Time to Learn
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
USAID	United States Agency for International Development

GLOSSARY OF TERMS

READING-RELATED TERMINOLOGY

Alphabetic knowledge/process. Familiarity with the alphabet and with the principle that written letters systematically represent sounds that can be blended into meaningful words.

Blend. A group of two or more consecutive consonants that begin a syllable (as gr- or pl- in English). This is different from a digraph because the letters keep their separate sounds when read.

Derivation. A word formed from another word or base, such as farmer from farm.

Digraph. A group of consecutive letters that combine to make a single sound (e.g., ea in bread, ch in chin). Some digraphs are graphemes (see below).

Fluency / Automaticity. The bridge between decoding and comprehension. Fluency is being able to read words quickly, accurately, and with expression (prosody). This skill allows readers to use more mental effort on making meaning than translating letters to sounds and forming sounds into words. At that point, readers are decoding quickly enough to be able to focus most of their effort on comprehension.

Fluency analysis. A measure of overall reading competence reflecting the ability to read accurately and quickly (see Fluency / Automaticity).

Grapheme. The most basic unit in an alphabetic written system that can change the meaning of a word. Graphemes represent phonemes. A grapheme might be composed of one or more than one letter; or of a letter with a diacritic mark (such as “é” vs. “e” in French).

Inflected form. A change in a base word in varying contexts to adapt to person, gender, tense, etc.

Morpheme. Smallest linguistic unit with meaning. Different from a word, as words can be made up of several morphemes (e.g., “unbreakable” can be divided into un-, break, and -able). There are bound and unbound morphemes. A word is an unbound morpheme, meaning that it can stand alone. A bound morpheme cannot stand alone (e.g., prefixes such as un-).

Onset. The first consonant or consonant cluster that precedes the vowel of a syllable; for example, spoil is divided into “sp” (the onset) and “oil” (the rime; see below).

Orthography. The written representation of the sounds of a language; spelling.

Phoneme. The smallest linguistically distinctive unit of sound that changes the meaning of a word (e.g., “top” and “mop” differ by only one phoneme, but the meaning changes).

Phonological awareness. Awareness that words are made of sounds; and the ability to hear, identify, and manipulate these sounds. Sounds exist at three levels of structure: syllables, onsets and rimes, and phonemes (see italicized terms).

Phonics. Instructional practices that emphasize how spellings are related to speech sounds in systematic ways.

Rime. The part of a syllable that consists of its vowel and any consonant sounds that come after it; for example, spoil is divided into “sp” (the onset; see above) and “oil” (the rime).

STATISTICAL TERMS

Ceiling effect. Occurs when there is an artificial upper limit on the possible values for a variable and a large concentration of participants score at or near this limit. This is the opposite of the floor effect (see below). For example, if an EGRA subtask is much too easy for most children, the scores will concentrate heavily at the upper end of the allowable range, restricting the variation in scores and negatively impacting the validity of the tool itself.

Convenience sample. Also known as reliance on available subjects, a convenience sample is a nonprobability sample that relies on data collection from population members who are easy to reach (or conveniently available). This method does not allow for generalizations and is of limited value in social science research.

Floor effect. Occurs when there is an artificial lower limit on the possible values for a variable and a large concentration of participants score at or near this limit. This is the opposite of the ceiling effect (see above). For example, if an EGRA subtask is much too difficult for most children, the scores will concentrate heavily at the lower end of the allowable range (typically with large proportions of zero scores), restricting the variation in scores and negatively impacting the validity of the tool itself.

Intra-class correlation coefficient (ICC). This is a descriptive statistic that is used when data are clustered into groups. The statistic ranges from 0 and 1 and provides a measure of how closely members of a group resemble each other in certain observable characteristics. ICCs can also be used to measure consistency of measurement across observers.

Kappa. Measures the extent to which two different ratings of the same subject could have happened by chance. Kappa values range from -1.0 to 1.0. Higher values indicate lower probability of chance agreement.

Population. The theoretical group of subjects (individuals or units) to whom a study’s results can be generalized. The sample (see below) and the population share similar characteristics, and the sample is a part of the population of interest.

Raw percentage agreement. Measures the extent to which raters make exactly the same judgment. Due to the lack of detail provided solely by this statistic, no benchmark is possible. Ideally, raters’ percentage agreement will be as high as possible (close to 100%) when they assess students. However, regardless of the % agreement, Kappa statistics must be referenced to understand the quality of the percentage agreement statistic.

Sample. The group of subjects (individuals or units) selected to be in a study.

Sampling unit. The individual members of the sample (see above); the unit from which data will be collected. For example, individuals or households may be the sampling unit.

Simple random sampling. The simplest form of probability sampling. Simple random sampling is a method in which every member of the population has the same probability of being selected for inclusion in the sample (see entries for italicized terms).

Test reliability. The consistency of scores a test-taker would receive on two different but equally difficult forms of the same test.

METHODOLOGICAL TERMS

Attrition. The gradual loss of subjects; often occurs in longitudinal studies when subjects drop out of the study before it is completed, for example, between the baseline and the midline.

Content validity. Term used to indicate the degree to which the items are representing the measurement of the intended skills.

Control group. Subjects who are randomly assigned not to receive treatment (intervention) and whose characteristics of interest are compared with those of a treatment group following the treatment.

Comparable test forms. Tests that are intended to be judged in relationship to each other and thus are designed with the same constructs, subtasks, etc.

Comparison group. Subjects who do not receive treatment (intervention) but are similar to the ones who receive the intervention, and whose characteristics of interest are compared to those of the treatment group following the treatment. Frequently selected based on similarity of certain characteristics with the treatment group (also called “matched comparison group”).

Equated test forms. Refers to test forms that have been adjusted by a statistical process in order to make scores comparable.

Equivalent test forms. Tests that are intended to be of equal difficulty (and thus directly substitutable for one another).

Face validity. Term used to indicate the extent to which a test overall is viewed as covering the concepts its designers intended to measure.

EXECUTIVE SUMMARY

Zambia has high primary school completion rates, at 92.4 percent in 2016 (Ministry of General Education, 2017). But, major challenges in learning outcomes persist, especially in relation to literacy rates. Therefore, the Government of the Republic of Zambia (GRZ) and several partners supported by USAID/Zambia collaborate in implementing several projects to improve early-grade reading skills. The governments and donors also need a simple system diagnostic to assess the extent of literacy improvements associated with the projects. Therefore, since 2006 USAID has also been funding RTI International (RTI) to develop a simple Early-Grade Reading Assessment (EGRA) tool that could help assess the foundational levels of student learning for various reading skills. Since 2006, the EGRA tool has been used by roughly 40 organizations in over 70 countries, including Zambia, and has been adapted for over 120 different languages.

Beginning in 2011, USAID/Zambia has supported the administration of several EGRAs in different regions of Zambia and languages with support from the Ministry of General Education (MoGE) and Examinations Council of Zambia (ECZ). ECZ has also conducted several national-level learner assessments and EGRAs. In 2016, RTI developed an EGRA toolkit, specifically for use in the Zambian context titled, “*EGRA Framework: Toolkit for the Early Grade Reading Assessment Adapted for Zambia*”.¹ ECZ utilized the toolkit to conduct a national level EGRA in April 2018, where over 4,700 Grade 3 learners sampled from 480 schools in the first term of the school year were tested.² The 2016 toolkit, however, needed to be updated to help ECZ to conduct large-scale EGRAs with Grade 2 learners. ECZ defines a large scale EGRA as one that covers all of the GRZ-designated languages of instruction and has a sample that is large enough to be representative and sufficient for accuracy and precision. Large scale EGRAs could produce rigorous data to support the MoGE to make policy decisions to improve learning outcomes in Zambia.

The USAID/Zambia funded Education Data activity was launched in April 2018, and was tasked to complete two EGRAs – a baseline in 2018 and a midline in 2020 – in Eastern, Southern, Muchinga, North Western and Western provinces to understand the reading performance of Grade 2 learners. The EGRAs will inform programmatic decisions under the Let’s Read Project, which started its implementation in early 2019 in the five provinces.

In 2018, the Education Data activity adapted the existing EGRA tool which is in the seven Zambian languages and deployed it to gather data from over 15,000 randomly selected Grade 2 learners from 816 schools sampled from the five provinces. This toolkit updates the 2016 RTI toolkit based on Education Data activity’s experience in 2018 in adapting EGRA tools, deploying them to gather data, and analyzing the data to report on early-grade reading skills in Zambia with specific contextual information for administering EGRAs in Zambia. Principle updates to the RTI toolkit that are included in this document are:

¹ RTI International (2016). EGRA Framework: Toolkit for the Early Grade Reading Assessment, Adapted for Zambia. Retrieved from: https://www.globalreadingnetwork.net/sites/default/files/eddata/Man_Zambia_EGRA_Task_28_EGRA_Framework_Toolkit_Adapted_for_Zambia_Final_revised26May2016.pdf.

² The assessed learners had a maximum of nine weeks of classroom instruction at the Grade 3 level. See: 2018 National Assessment Survey of Learning Achievement in Grade 2: Results for Early Grade Reading and Mathematics in Zambia. April 2018 (Document provided by ECZ).

- Guidelines for adapting EGRA subtasks into seven different Zambian languages;
- Designing and implementing a syllable identification sub-task;
- Differentiating learning goals for training and assessing quality control officers (QCOs) and assessors engaged in data collection;
- Use of an improved application to gather data electronically and frequently monitor data quality during data collection;
- Planning for and managing data collection in the field

This toolkit is intended for those managing EGRAs and as such is not a technical guide for assessing early-grade reading skills.

I. INTRODUCTION

I.1 PURPOSE OF THE TOOLKIT

The Examinations Council of Zambia (ECZ) has conducted several national-level learner assessments and small scale EGRAs. In 2016, RTI prepared an EGRA toolkit for Zambia, “*EGRA Framework: Toolkit for the Early Grade Reading Assessment Adapted for Zambia*”.³ The toolkit adapted the latest edition of the “Early Grade Reading Assessment (EGRA) Toolkit 2.0” published in 2016 to suit the Zambian context.⁴ ECZ utilized the toolkit to conduct a national level EGRA in April 2018, where over 4,700 Grade 3 learners sampled from 480 schools in the first term of the school year were tested.⁵ However, the toolkit developed by RTI needed to be updated to help ECZ to conduct large-scale EGRAs with Grade 2 learners. ECZ defines a large scale EGRA as one that covers all of the GRZ-designated languages of instruction and has a sample that is large enough to be representative and sufficient for accuracy and precision. Large scale EGRAs produce rigorous data that support MoGE to improve learning outcomes in Zambia. In 2018, the Education Data activity followed several updated procedures from those that were discussed in the 2016 toolkit to efficiently conduct a large scale EGRA in 2018. Therefore, the 2016 RTI toolkit was revised based on Education Data activity’s experience conducting a large scale of EGRA in 2018, which ECZ could utilize in future assessments. This toolkit is a maybe updated in 2020 based on the Activity’s experiences in the 2020 midline EGRA. It is intended for those managing EGRAs in Zambia, including ECZ, and not as a technical guide for assessing early-grade reading skills.

The toolkit explains how the EGRA tools are adapted, deployed, and analyzed with specific contextual information for conducting a large scale EGRA in Zambia. Section 2 discusses the purpose and uses of EGRA followed by Section 3 which covers the theoretical foundations of the EGRA. Section 4 reviews the instrument design, while Section 5 describes electronic data collection. In Section 6 there is an overview of training Quality Control Officers (QCOs) and assessors who administer the EGRA. Section 7 concerns the data collection for the pilot and full EGRA that was conducted in 2018. Sections 8 and 9 cover the processing, cleaning, analysis, and reporting of EGRA data. Finally, Section 10 concludes with a discussion on presenting results to policymakers, with specific focus on benchmarks.

I.2 WHY DO WE NEED EARLY-GRADE READING ASSESSMENTS (EGRAs)?

Countries around the world have boosted primary school enrollment to historically unprecedented rates. Thanks to the targeted efforts of the United Nations’ Education for All (EFA) campaign and the Millennium Development Goals (MDGs) that were slated for achievement by 2015, the world has seen dramatic improvements in primary school enrollment rates; in some places they are now nearly the same rates as in high-income countries. The net enrollment rate for primary school in developing regions has reached

³ RTI International (2016). EGRA Framework: Toolkit for the Early Grade Reading Assessment, Adapted for Zambia. Retrieved from:

https://www.globalreadingnetwork.net/sites/default/files/eddata/Man_Zambia_EGRA_Task_28_EGRA_Framework_Toolkit_Adapted_for_Zambia_Final_revised26May2016.pdf.

⁴ Early Grade Reading Assessment (EGRA) Toolkit 2.0 (March 2016). Retrieved from:

https://www.globalreadingnetwork.net/sites/default/files/resource_files/EGRA%20Toolkit%20Second%20Edition.pdf

⁵ The assessed learners had a maximum of nine weeks of classroom instruction at the Grade 3 level. See: 2018 National Assessment Survey of Learning Achievement in Grade 2: Results for Early Grade Reading and Mathematics in Zambia. April 2018 (Document provided by ECZ).

an estimated 91 percent in 2015, up from 83 percent in 2000; and the number of out-of-school children of primary school age worldwide has fallen by almost half in the same time frame (United Nations, 2015).

Data on results from low-income countries that have participated in various international assessments—including tests administered in grades 1 through 3—are now available for comparison on the World Bank’s online EdStats Dashboard page on learning outcomes (World Bank, 2015). However, the evidence still indicates that while enrollment has increased, average student learning in most low-income countries remains quite low. The World Bank recently summarized the situation as this: “There is broad consensus among the international community that the achievement of the education Millennium Development Goal (MDG) requires improvements in learning outcomes” (World Bank, 2015b); and Quality Education was adopted globally as Goal 4 of the post-2015 Sustainable Development Goals (United Nations Development Programme [UNDP], 2015). The importance of education quality for national economic development is another area of broad agreement: “Recent research reveals that it is learning rather than years of schooling that contributes to a country’s economic growth: A 10 percent increase in the share of students reaching basic literacy translates into an annual growth rate that is 0.3 percentage points higher than it would otherwise be for that country” (Hanushek & Woessman, 2009, as cited in Gove & Wetterberg, 2011, pp. 1–2).

At the time the first edition of an EGRA toolkit was written in 2009, the most commonly used assessments were able to reveal what low-income country students did not know, but could not ascertain what they did know, often because they scored so poorly that the test could not pinpoint their location on the knowledge continuum. Furthermore, most national and international assessments were historically administered as paper-and-pencil tests to students in grade 4 and above (that is, they assumed students could read and write). It was not always possible to tell from the results of these tests whether students scored poorly because they lacked the knowledge tested by the assessments, or because they lacked basic reading and comprehension skills. Since 2010, a turn toward reading-skill assessments in the early grades—due in large part to the influence of the United States Agency for International Development (USAID) and the World Bank—marks a change in awareness among international education researchers and stakeholders regarding the need for more empirical information about young children’s ability to read with comprehension.

The ability to read and comprehend a simple text is one of the most fundamental skills a child can learn. Without basic literacy there is little chance that a child can escape the intergenerational cycle of poverty. Yet in many countries, students enrolled in school for as many as six years are unable to read and understand a simple text. Evidence indicates that learning to read both early and at a sufficient rate with comprehension is essential for learning to read well.

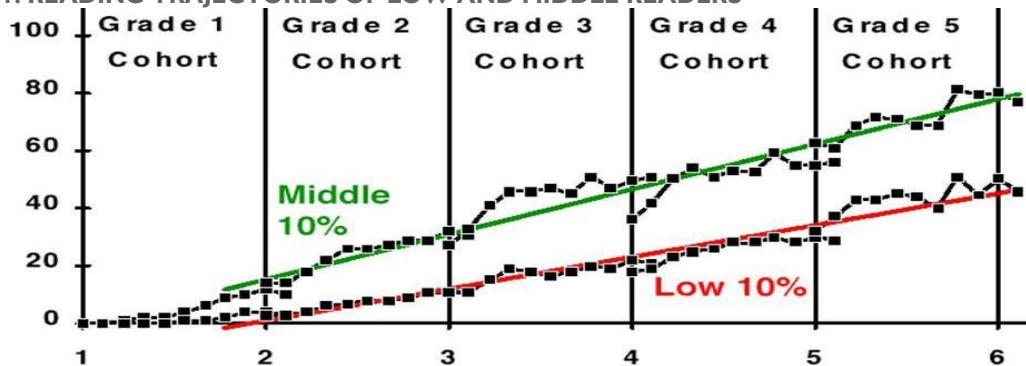
1.2.1 WHY ASSESS READING?

Basic literacy is the foundation children need to be successful in all other areas of education. Children first need to “learn to read” so that they can “read to learn.” That is, as children pass through the grade levels, more and more academic content is transmitted to them through text, and their ability to acquire new knowledge and skills depends largely on their ability to read and extract meaning from text. For example, mathematics is an important skill, but using a mathematics book requires the ability to read. Students are also increasingly required to demonstrate their learning through writing, a skill integrally tied to reading. Moreover, a low level of literacy severely constrains a person’s capacity for self-guided and lifelong learning that is so important beyond the classroom walls into the world of adult responsibilities.

I.2.2 WHY ASSESS EARLY?

Acquiring literacy becomes more difficult as students grow older; children who do not learn to read in the first few grades are more likely to repeat grades and eventually drop out. That is, if strong foundational skills are not acquired early on, gaps in learning outcomes (between the “haves” and the “have-nots”) grow larger over time (see Figure 1 as well as Adolf et al., 2010; Daniel et al., 2006; Darney, Reinke, Herman, Stormont, & Jalongo, 2013; Scanlon, Gelzheiser, Vellutino, Schatschneider, & Sweeney, 2008; Torgesen, 2002). The common metaphor of “the rich get richer and the poor get poorer” is often quoted in discussions of the disparities that occur between fluent and non-fluent readers for children who are unable to acquire reading and comprehension skills in the early grades (Gove & Wetterberg, 2011).

FIGURE 1: READING TRAJECTORIES OF LOW AND MIDDLE READERS



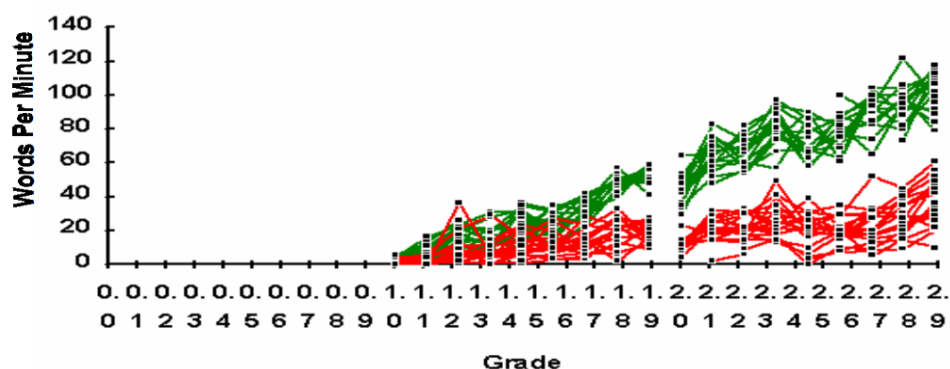
Source: Good, Simmons, & Smith, 1998

Unlike many skills such as walking and speaking, the ability to read is not acquired naturally without instruction. Studies suggest that without quality instruction, a child who reads poorly in the early grades will continue to read poorly in the upper grades, and will require more and more instructional intervention in order to “catch up” (Juel, 1988).

Figure 2 documents the trajectory of student performance on oral reading fluency for a group of students during grades 1 and 2 in the United States among students who did not receive additional instruction for reading improvement. The cluster of lines in the upper part of the left side of the graph shows monthly results for students who could read at least 40 words per minute at the end of first grade, while the cluster of lines at the bottom shows the results for students who read fewer than 40 words per minute at the end of first grade. (Each unit on the horizontal axis represents a month in the school year.)

As can be seen in Figure 2, the gap between more proficient and less proficient readers increases dramatically by the end of second grade (right side of graph). In the absence of timely intervention or remediation, this initial gap in reading acquisition is likely to widen over time and become increasingly difficult to bridge.

FIGURE 2: STUDENT WORDS PER MINUTE SCORES, GRADES 1 AND 2



Source: Good, Simmons, & Smith, 1998

Note: Numbers on the horizontal axis refer to the grade (top row) and month (bottom row).

The more children struggle at school, the greater the risk they will become discouraged and drop out, forfeiting any potential benefits that education would afford them later in life. In contrast, the more and better they learn, the longer they tend to stay in school (Patrinos & Velez, 2009). One study found that the strongest predictor of primary school completion in Senegal was the child’s level of success in second grade (Glick & Sahn, 2010). Whether for an individual child or for a whole educational system, it is more efficient to address a reading deficit in the early grades than later.

1.2.3 WHY ASSESS ORALLY?

Traditional paper-based tests require that children already have acquired basic reading fluency and comprehension skills. If they have not—i.e., if they are unable to read the question or write the answer—the results will suffer from a floor effect with a high percentage of zero scores. In those cases, the paper-based test indicates only what the children do not know, but not what they do know or where they are along the developmental path.

In many countries, students must pass a national exit examination at the end of grade 6 in order to earn their primary education completion certificate and/or to enter secondary school (Braun & Kanjee, 2006). Furthermore, international assessments through the Progress in International Reading Literacy Study, or PIRLS (given to fourth graders) and Programme for International Student Assessment, or PISA (given to 15-year-olds) are administered in numerous (mostly high-income) countries around the world.⁶ In both kinds of assessments, students are generally asked to read several short passages and to answer multiple-choice questions. If the students’ reading and comprehension skills are insufficient to understand the test, they will fail the assessment—but the resulting data will not reveal why they failed. Did the students not have the knowledge to answer the questions, or were they just unable to read the questions?

Reading fluency and comprehension are relatively higher-order skills in the reading acquisition process, and they build upon several lower-order, foundational skills such as phonological awareness, alphabet knowledge, decoding, and vocabulary, which can be detected through an oral assessment. An oral assessment therefore can give us more information about what they actually do know and where they are

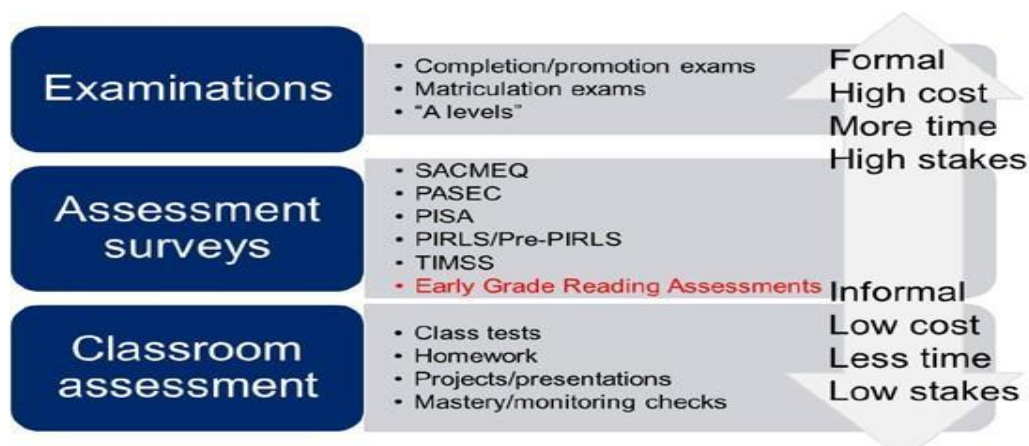
⁶ Zambia is one of seven countries participating in the PISA for Development project which launched in February 2014.

in the reading acquisition process early on. Oral assessments can also help reveal early growth over time—that is, changes that are not yet detectable on a paper-based test but that nonetheless constitute progress toward reading acquisition.

1.2.4 EGRA'S PLACE AMONG ASSESSMENT OPTIONS

To explain where EGRA fits in the landscape of assessment options, it is useful to place different types of assessments on a continuum (as displayed in Figure 3). The continuum is broken into three broad categories: examinations, assessment surveys, and classroom assessments. Kanjee (2009) defines examinations as processes used for testing the qualifications of candidates (e.g., quarterly exams, promotion exams, and matriculation exams). These are typically longer, more formal assessments that are administered to all students (thus making them more time-intensive and costlier). At the other end of the spectrum are classroom assessments, which are defined as measures used to obtain evidence on knowledge, skills, and attitudes of individual learners for the purpose of improving teaching and learning (Kanjee, 2009). These more informal assessments often come in the form of classroom tests, homework assignments, and projects/presentations. By design, classroom assessments are intended to be cheaper, to take less time, and to involve lower stakes compared to other examinations.

FIGURE 3: DIFFERENT TYPES OF ASSESSMENTS



Source: Adapted from Kanjee, 2009

Assessment surveys are designed with the explicit purpose of obtaining information on the performance of students, as well as on education systems as a whole. In addition to the PIRLS and PISA, there are many other international and regional assessments that fit into this category, such as those carried out by the Southern and Eastern Africa Consortium for Monitoring Educational Quality (SACMEQ), the Programme d'Analyse des Systèmes Educatifs de la CONFEMEN (PASEC), the Laboratorio Latinoamericano de Evaluación de la Calidad de la Educación (LLECE), and the Trends in International Mathematics and Science Study (TIMSS). Since the assessments associated with these programs are intended to measure trends in literacy achievement for cross-country comparisons, they require long-term development processes, local language complications, and complex scaling/scoring procedures. Additionally, every one of these assessments requires basic reading ability (i.e., the assessment is based on passage reading), which limits the value and appropriateness for measuring early-grade reading skills in developing countries due to major floor effects. In recent years, new early-grade reading assessments (e.g., Pratham's Annual Status of Education Report [ASER] assessment, World Vision's Functional Literacy Assessment Tool [FLAT])

assessment) have been developed in order to fill this gap. These individually administered assessments are touted as being “smaller, quicker, cheaper” as compared with international tests (Wagner, 2011).

I.3 DEVELOPMENT OF THE EGRA INSTRUMENT

In the context of these questions about student learning and continued investment in education for all, departments of education and development professionals at the World Bank, USAID, and other institutions called for the creation of simple, effective, and low-cost measures of student learning outcomes (Abadzi, 2006; Center for Global Development, 2006; Chabbott, 2006; World Bank: Independent Evaluation Group, 2006). Some analysts have even advocated for the establishment of a global learning standard or goal, in addition to the original Education for All and Millennium Development Goals (Filmer, Hasan, & Pritchett, 2006) and Sustainable Development Goal 4 (UNDP, 2015). Whether reading well by a certain grade could be such a goal is open to debate, but the issue of specific and simple learning measures is now on the policy agenda.

To respond to this demand, work began on the creation of an Early-Grade Reading Assessment: a simple instrument that could report on the foundation levels of student learning, including assessment of the first steps students take in learning to read. In October 2006, USAID contracted RTI International through the Education Data for Decision Making (EdData II) project to develop an instrument to help USAID partner countries begin the process of measuring in a systematic way how well children in the early grades of primary school were acquiring reading skills. Ultimately, the hope was to spur more effective efforts to improve performance in these core skills by using an assessment that can easily be adapted to new contexts and languages, has a simplified scoring system, and is low stakes and less time intensive for the individuals being assessed.

Based on a review of research and existing reading tools and assessments, RTI developed a protocol for an individual oral assessment of students’ foundational reading skills. In an initial EGRA workshop hosted by USAID, the World Bank, and RTI in November 2006, cognitive scientists, early-grade reading experts, research methodologists, and assessment experts reviewed the proposed instrument and provided feedback and confirmation on the protocol and validity of the approach. The workshop included contributions from more than a dozen experts from a diverse group of countries, as well as some 15 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.

During these early stages of development of the EGRA instrument, a decision was reached to make EGRA open source and readily available to support a higher level and wider dissemination of knowledge on reading and learning outcomes. The purpose behind this decision was to ensure that both technical and nontechnical audiences would become more aware of current education information for their context and would be able to apply it in making decisions and creating policies.

I.4 THE INSTRUMENT IN ACTION

In 2007, the World Bank supported a pilot of the draft instrument in Senegal (French and Wolof) and The Gambia (English), while USAID supported a pilot in Nicaragua (Spanish). After these initial pilots, use of EGRA expanded across several funders and numerous implementers, countries, and languages. Since 2006 USAID has been one of the largest sponsors of EGRA administrations in several countries, including in Zambia.

FIGURE 4: MAP OF EGRA ADMINISTRATIONS



Source: RTI International for the EdData II Project website, <http://www.eddataglobal.org/countries/index.cfm>

As of July 2016, the EGRA has been used by roughly 40 organizations in over 70 countries, including Zambia. The early-grade reading approach also shifted to focus on mother-tongue instruction, and as such the instrument has been adapted for administration in over 120 different languages.

1.5 EGRA'S PRESENCE IN ZAMBIA

USAID/Zambia has supported EGRA data collections on several occasions over the past few years. Starting in 2011, RTI International, with funding and support from USAID, conducted an EGRA in Icibemba in 40 schools across four provinces (Northern, Luapula, Copperbelt, and Central). The purpose of this EGRA application was to provide information to USAID and Zambia's Ministry of General Education (MOGE) about student learning outcomes with regard to literacy in a small sample of schools.

Then, in 2014, RTI International supported the Examinations Council of Zambia (ECZ) to administer the Grade 2 National Assessment Survey (G2 NAS), which included the EGRA. The 2014 survey was administered in 486 schools to a total of 4,855 students. The EGRA was adapted for all seven Zambian national languages. Along with the EGRA, RTI and the ECZ also administered the following tools as part of the G2 NAS: Early-Grade Mathematics Assessment (EGMA) survey, funded by the UK Department for International Development [DFID]), student interview questionnaire, teacher interview questionnaire, head teacher interview questionnaire, and classroom and school inventories. The purpose of this survey was to provide information to the MOGE and international donors about student performance in reading and mathematics, as well as school-level factors that impact those outcomes, to contribute to evidence-based decision-making about education policy and practice.

Aside from the above mentioned EGRA applications, USAID/Zambia has also used EGRA before and during implementation of school-level intervention projects to generate impact evaluation data:

- **READ TO SUCCEED (RTS):** In November 2012 and 2014, RTS collected EGRA data from grade 2 and 3 students in 200 government schools in six provinces (Northern, Luapula, Muchinga, Eastern, North Western, and Western) and four languages (Icibemba, Cinyanja, Kikaonde, and Silozi). Along with the EGRA, RTS also administered the following tools: school data form; head teacher interview and performance checklist; MOGE officials' interview form; teacher interview and performance checklist; and classroom observation form.
- **TIME TO LEARN (TTL):** In November 2012 and 2014, TTL collected EGRA data from 102 community schools in six provinces (Lusaka, Central, Eastern, Copperbelt, Southern, and Muchinga) and three languages (Chinyanja, Icibemba, and Chitonga). EGRA was administered to a maximum of 20 students in grade 2 per school, with a total sample of 1,500 learners. Along with the EGRA, TTL also administered the following tools: community school questionnaire; community school head teacher questionnaire; zonal head questionnaire; grade 2 teacher questionnaire and focus group discussion; standard classroom observation protocol for literacy; learner focus group discussion; and parent community school committee focus group discussion.
- ECZ also administered a nation-wide EGRA in April 2018. The EGRA covered over 4,700 Grade 3 learners sampled from 480 schools in the first term of the school year. The assessed learners had a maximum of nine weeks of classroom instruction at the Grade 3 level.⁷
- The Education Data activity: In November 2018, the USAID Education Data Activity collected EGRA data from over 800 schools in five provinces (Eastern, Muchinga, North West, Southern, and Western) and in seven languages (Chitonga, Cinyanja, Icibemba, Kiikaonde, Lunda, Luvale, and Silozi). Up to 20 Grade 2 learners per school were tested. Along with the EGRA, the Education Data Activity also administered a learner questionnaire, teacher questionnaire, head teacher questionnaire, and school inventory checklist.

⁷ 2018 National Assessment Survey of Learning Achievement in Grade 2: Results for Early Grade Reading and Mathematics in Zambia. April 2018 (Document provided by ECZ).

2 PURPOSE AND USES OF EGRA

2.1 HISTORY AND OVERVIEW

Although it was clear from the outset that EGRA would focus on the early grades and the foundational skills of reading, uses of the results were more open to debate.

The original EGRA instrument was primarily designed to be a sample-based “system diagnostic” measure. Its main purpose was to document student performance on early-grade reading skills in order to inform governments and donors regarding system needs for improving instruction. Over time, its uses have expanded to include all of the following, with different uses in different contexts:

- Generate baseline data on early reading acquisition in particular grades and/or geographies
- Guide the design of instructional programs by identifying key skills or areas of instruction that need to be improved
- Identify changes in reading levels over time
- Evaluate the outcomes or impact of programs designed to improve early-grade reading
- Explore cost-effectiveness of different program designs
- Develop reading indicators and benchmarks
- Serve as a system diagnostic to inform education sector policy, strategic planning, resource allocation

In addition, “the subtasks included in EGRA can be adapted for teachers to inform their instruction.⁸ As a formative assessment, teachers can either use EGRA in its entirety or select subtasks to monitor classroom progress, determine trends in performance, and adapt instruction to meet children’s instructional needs” (Dubeck & Gove, 2015, p. 2).

However, to be clear, as it is currently designed, EGRA has its limitations. It is not intended to be a high-stakes accountability measure to determine student grade promotion or to evaluate individual teachers. EGRA is designed to complement, rather than replace, existing curriculum-based pencil-and-paper assessments. EGRA is made up of a set of subtasks that measure foundational skills that have been found to be predictive of later reading success. However, due to the constraints imposed by children’s limited attention span and stamina, neither EGRA nor any other single instrument is capable of measuring all skills required for students to read with comprehension. EGRA is not intended to be an instructional program, but rather is capable of informing instructional programs. EGRA cannot fully determine background or literacy behaviors that could impact a student’s ability to read (Dubeck & Gove, 2015). Moreover, EGRA’s measures are restricted to skills that are subject to influence by instruction, so that the findings will be actionable.

2.2 EGRA AS A SYSTEM DIAGNOSTIC

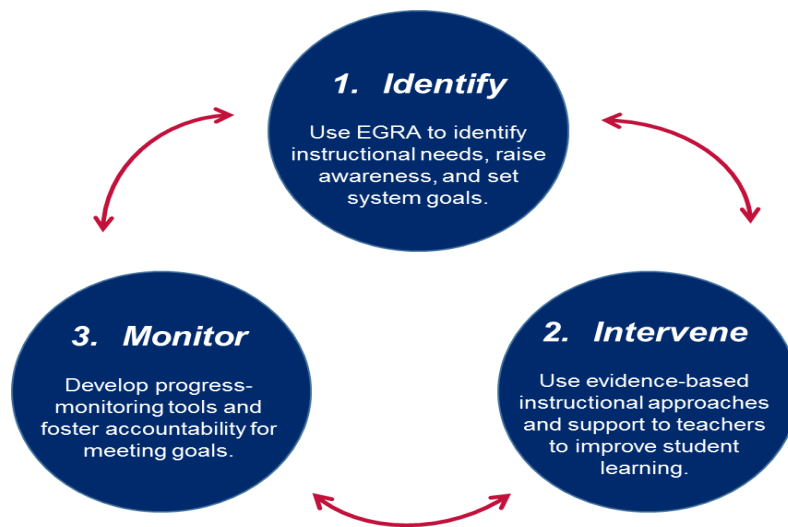
The system diagnostic EGRA, as presented in this toolkit, is designed to fit into a complete cycle of learning support and improvement. As depicted in Figure 5, EGRA can be used as part of a comprehensive

⁸ Using EGRA as a classroom-based formative assessment can be done only with specific required modifications to the instrument and sampling procedures. Classroom-based assessments would also require teachers’ professional development, with specific instructions on administration and interpretation of subtasks.

approach to improve student reading skills, with the first step being an overall system-level identification of areas for improvement. EGRA is able to generate baseline data on early reading acquisition (Gove & Dubeck, 2015). General benchmarking and creation of goals for future applications can also be done during the initial EGRA application. Based on EGRA results, education ministries or local systems can then intervene to guide the content of new or existing programs using evidence-based instructional approaches to support teachers for improving foundational skills in reading. Results from EGRA can thus inform the design of both pre-service and in- service teacher training programs.

Once recommendations are implemented, parallel forms of EGRA can be used to follow progress and gains in student learning over time through continuous monitoring, with the expectation that such a process will encourage teachers and education administrators to ensure students make progress in achieving foundational skills.

FIGURE 5: THE CONTINUOUS CYCLE OF IMPROVING STUDENT LEARNING



When working at the system level, researchers and education administrators frequently begin with student-level data, collected on a sample basis and weighted appropriately, in order to draw conclusions about how the system (or students within the system) is performing. Using average student performance by grade at the system level, administrators can assess where students within the education system are typically having difficulties and can use this information to develop appropriate instructional approaches. Like all assessments whose goal is to diagnose difficulties and improve learning outcomes, in order for a measure to be useful: (1) the assessment relates to existing performance expectations and benchmarks, (2) the assessment correlates with later desired skills, and (3) it must be possible to modify or improve upon the skills through additional instruction (Linan-Thompson & Vaughn, 2007). EGRA meets these requirements as follows.

First, in many high-income countries, teachers (and system administrators) can look to existing national distributions and performance standards for understanding how their students are performing compared to others. In the United States and Europe, by comparing subgroup student performance in relation to national distributions and performance standards, system administrators can decide whether schools and teachers need additional support. In a similar way, EGRA can be used by low-income countries to pinpoint regions (or if the sample permits, schools) that merit additional support, including teacher training or

other interventions. When EGRA was first designed, the problem for low-income countries was that similar benchmarks based on locally generated results were not yet available. In the meantime, work has been begun in at least 12 countries, including Zambia, to draft national or regional benchmarks using EGRA data. In July 2015, MOGE and the ECZ worked with key partners and experts to use EGRA data from the Grade 2 NAS to define and draft benchmarks for specific skill areas of early-grade reading and math.

Second, the EGRA tasks were developed intentionally to be predictive of later reading achievement, and numerous administrations of EGRA in multiple countries and languages have generally confirmed the expected correlations. Although the phonological and orthographic variations among languages influence the rate and timing of reading acquisition, all of the skills measured by EGRA have been shown to correlate to reading skills in alphabetic orthographies. As an example, knowing the relationship between sounds and the symbols that represent them has a predictive relationship to success with word reading. Oral reading fluency has been shown to be predictive of reading comprehension. These skills are measured in EGRA and, therefore, we can assume with confidence that EGRA results relate something meaningful about the direction in which the children are headed in the reading acquisition process.

Third, EGRA not only gives meaningful predictions about future performance, but also can direct attention to needed instructional changes. It makes little sense to measure reading skills unless there is a plan to employ additional instruction to improve those skills. EGRA is valuable as a diagnostic tool precisely because it includes measures of those reading skills that can be improved through instruction.

3 CONCEPTUAL FRAMEWORK AND RESEARCH FOUNDATIONS

The conceptual framework of reading acquisition underpinning the development of EGRA is guided by the work of the U.S. National Reading Panel (National Institute of Child Health and Human Development, 2000), August and Shanahan (2006), and the Committee on the Prevention of Reading Difficulties in Young Children (Snow, Burns, & Griffin, 1998), among others. The extensive literature on reading points to the need for students to acquire specific skills through targeted instruction in order to become successful lifelong readers.

3.1 SUMMARY OF SKILLS NECESSARY FOR SUCCESSFUL READING

The ultimate goal of learning to read is comprehension, or “the process of simultaneously extracting and constructing meaning through interaction and involvement with written language” (Snow & the RAND Reading Study Group, 2002, p. 11). To competent readers, reading may seem effortless; they read a text and understand it with such speed and ease that they are not conscious of the process of comprehension itself. However, comprehension is actually a highly complex skill that is built from a wide array of subskills working together simultaneously.

Reading acquisition is seen as a developmental process (Chall, 1996). Higher-order skills (e.g., fluency and comprehension) build on lower-order skills (e.g., phonemic awareness, letter sound knowledge, and decoding), and the lower-order skills have been shown to be predictive of later reading achievement. Therefore, even if children cannot yet read a passage with comprehension, we can nonetheless measure their progress toward acquiring the lower-order skills that are necessary steps along the path to that end.

Five components are generally accepted as necessary to master the process of reading: phonological awareness, phonics (method of instruction that helps teach sound–symbol relationships), vocabulary, fluency, and comprehension (Armbruster, Lehr, & Osborn, 2003; Vaughn & Linan-Thompson, 2004). The skills within each component are not sufficient on their own to produce successful reading, but they build on one another and work together to reach the ultimate goal of reading—i.e., comprehension. The EGRA subtasks are aligned to these components of reading. Because these skills are acquired in phases, at any given point in time, some subtasks are likely to have floor effects (that is, most children in the early grades would not be able to perform at a sufficient skill level to allow for analysis) and others ceiling effects (almost all children receive high scores), depending on where the children are in their development.

3.2 PHONOLOGICAL AWARENESS

3.2.1 DESCRIPTION

Phonological awareness can be defined as “the ability to detect, manipulate, or analyze the auditory aspects of spoken language (including the ability to distinguish or segment words, syllables, or phonemes), independent of meaning” (National Center for Family Literacy [NCFL], 2008, p. vii). Phonemic awareness, a term often used interchangeably with phonological awareness, is actually a subset thereof and refers specifically to the awareness of phonemes, which are the smallest units of sound that distinguish the

meaning of a word in a given language. For example, the English consonant sounds /p/⁹, /k/, and fricative /ð/ (i.e., the “th” sound) are the phonemes that make the word “pat” distinguishable from “cat” and “that” in spoken language.

Similarly, in alphabetic orthographies, a grapheme is to written language what a phoneme is to oral language—that is, as explained in the glossary at the beginning of the toolkit, it is “the most basic unit in an alphabetic written system that can change the meaning of a word. A grapheme might be composed of one or more than one letter; or of a letter with a diacritic mark.” Languages vary in the degree of direct correspondence between phonemes and graphemes; in some languages, like Spanish, graphemes and phonemes have nearly a one-to-one correspondence, but in English, the mapping is much more complex. For example, in English the phoneme /k/ may be spelled with the letters c, k, ck, ch, qu, etc., just as the letter c may represent the phoneme /k/ in one word and /s/ in another.

As humans process rapid oral language input, our phonological knowledge remains, for the most part, efficiently subconscious. Learning to read (in alphabetic orthographies), however, requires linking graphemes to individual phonemes, which requires a conscious awareness of the phonemes in the language and the ability to distinguish between and manipulate them (Gove & Wetterberg, 2011). Phonological awareness enables children to separate words into sounds and blend sounds into words, oral skills that are necessary precursors to decoding and spelling.

Research suggests that children’s awareness of speech sounds develops progressively, beginning with larger units—i.e., at the word level—then moving to the smaller units of the syllable, onset–rime (beginning and ending sounds), and finally, the phoneme. In fact, sensitivity to the phoneme level, which is essential for word decoding, may not begin to develop until the onset of literacy instruction (Goswami, 2008). Phonological awareness has been shown across numerous studies in multiple languages to be predictive of later reading achievement (Badian, 2001; Denton, Hasbrouck, Weaver, & Riccio, 2000; Goikoetxea, 2005; McBride-Chang & Kail, 2002; Muter, Holme, Snowling, & Stevenson, 2004; Wang, Park, & Lee, 2006).

3.3 ALPHABETIC PRINCIPLE, PHONICS, AND DECODING

3.3.1 DESCRIPTION

The alphabetic principle is the understanding that words are made up of sounds (i.e., phonemes) and that letters (i.e. graphemes) are symbols that represent those sounds. The alphabetic principle is an abstract concept which is best taught explicitly to students in order to clarify what the symbols on the page represent in their most elemental forms. When students understand that sounds map onto letters, they can begin to learn to decode words. Alphabet knowledge includes knowledge of the individual letter names, their distinctive graphic features, and which phoneme(s) each represents.

Teaching these grapheme-to-phoneme and phoneme-to-grapheme mappings is an instructional method commonly known as phonics. Research has shown alphabet knowledge to be a strong early predictor of

⁹ Phonemes are traditionally written between slashes in the International Phonetic Alphabet. The full IPA chart is available for reference and use from <http://www.internationalphoneticassociation.org/content/ipa-chart>, under a Creative Commons Attribution-Sharealike 3.0 Unported License. Copyright © 2005 International Phonetic Association.

later reading achievement (Adams, 1990; Ehri & Wilce, 1985; Piper & Korda, 2010; Wagner, Torgesen, & Rashotte, 1994; Yesil-Dağlı, 2011), for both native and nonnative speakers of a language (Chiappe, Siegel, & Wade-Woolley, 2002; McBride-Chang & Ho, 2005; Manis, Lindsey, & Bailey, 2004; Marsick & Watkins, 2001). One of the main differences between successful readers and struggling readers is their ability to use the letter–sound correspondences to decode new words they encounter in text and to encode (spell) the words they write (Juel, 1991).

According to the dual route model of word recognition (Coltheart, Rastle, Perry, Langdon, & Ziegler, 2001; Zorzi, 2010), there are two distinct but not mutually exclusive ways in which humans process text to recognize words. They are referred to as the lexical and sub-lexical routes.

Reading via the lexical route involves looking up a word in the mental lexicon containing knowledge about spellings and pronunciations of real words. Instant word recognition means that the word on the page is familiar and instantly recognizable because of knowledge of the letter strings and spelling pattern. In the sub-lexical route, we decode the word by converting the letters into sounds using our knowledge of their mappings, blend the sounds into a word, and then recognize the word based on its phonological form.

The lexical route may be faster for familiar words, and is necessary for processing words with irregular spellings, but the sub-lexical route is necessary for processing new or unfamiliar words. In languages with highly consistent orthographies (and therefore few irregular spellings), all words are essentially decodable and accessible through the sub-lexical route. EGRA uses the nonword reading task to assess student skills in decoding via the sub-lexical route.

LANGUAGE PHONOLOGIES AND ORTHOGRAPHIES

Languages vary in the complexities of their phonologies (sound systems); some languages have many more phonemes than others, some allow much more complex syllable structures (e.g. with consonant clusters in initial and final position), some have much longer words on average than others, etc. Likewise, orthographies (spelling system of a language) vary in the degree of transparency or consistency of the letter-sound relationships.

In highly transparent orthographies, the correspondence between phonemes and graphemes is nearly one-to-one. This facilitates their acquisition because almost every letter will reliably represent one and the same sound regardless of the word in which it appears, and vice versa. By contrast, English has what is called an opaque or deep orthography, because nearly every letter maps to more than one sound and every sound to more than one letter, thereby complicating the mapping process considerably.

In brief, both the relative complexity of the phonological system of a given language and its orthography have consequences for the rate of acquisition of related reading subskills such as phonics. At the two extremes, a child learning to read in a consistent, transparent orthography of a language with relatively low phoneme inventory, simple syllable structures, and short average word lengths will be at an advantage for mastering the letter-sound mappings and decoding skills more rapidly than a child learning to read in a language with an opaque orthography, many irregularities, many phonemes, complex syllable structures, and long average word lengths. This is one reason why cross-linguistic benchmarks as well as comparisons of EGRA findings are not appropriate.

3.3.2 MEASURES OF ALPHABET KNOWLEDGE AND DECODING SKILLS

EGRA assesses children's alphabet knowledge in several ways, beginning with the letter sound identification subtask, a component of the core EGRA. The letter sound identification subtask tests children's ability to recognize the graphemic features of each letter and accurately map it to its corresponding name or sound. Children are given a written list of capital and lowercase letters (and diphthongs or digraphs if appropriate) in random order and asked to articulate either the name or the sound of each.

The next step up in skill difficulty is for readers to use their mastery of the letter-sound correspondences to decode words. Therefore, the nonword reading subtask, another core EGRA subtask, provides indirect insight into children's ability to decode unfamiliar words. The nonword reading subtask presents the children with a written list of pseudowords that follow the phonological and spelling rules of the language but are not actual words in the language. Children are asked to read out loud as many of the nonwords as they can, as quickly and carefully as they can. According to the dual-route model, this subtask requires children to apply their decoding skills based on their knowledge of the grapheme-phoneme mappings. Because nonwords will not have any whole-word representation previously stored in long-term memory to be accessed directly, students must rely on decoding in order to identify them.

3.4 VOCABULARY AND ORAL LANGUAGE

3.4.1 DESCRIPTION

Reading comprehension involves more than just word recognition. In order to construct meaning, we must link the words we read to their semantic representation or meaning attached to the word in our minds; and knowing the meaning of words relates to one’s overall oral language comprehension (Kamhi & Catts, 1991; Nation, 2005; Rayner, Foorman, Perfetti, Pesetsky, & Seidenberg, 2001). Vocabulary refers to the ability to understand the meaning of words when we hear or read them (receptive), as well as to use them when we speak or write (productive). Reading experts have suggested that vocabulary knowledge of between 90 and 95 percent of the words in a text is required for comprehension (Nagy & Scott, 2000). It is not surprising, then, that in longitudinal studies, vocabulary has repeatedly been shown to influence and be predictive of later reading comprehension (Muter et al., 2004; Roth, Speece, & Cooper, 2002; Share & Leiken, 2004).

3.4.2 MEASURES OF VOCABULARY

Although none of the core EGRA subtasks measures vocabulary directly, an optional, untimed vocabulary subtask measures receptive-language skills of individual words and phrases related to body parts, common objects, and spatial relationships. This subtask has been used in a few contexts but has not yet been through the same expert panel review and validation process as the other subtasks.

In addition, listening comprehension, which is a core EGRA subtask, assesses overall oral language comprehension, and therefore, indirectly, oral vocabulary on which it is built in part. For this subtask, assessors read children a short story on a familiar topic and then ask children three to five comprehension questions about what they heard. The listening comprehension subtask is used primarily in juxtaposition with the reading comprehension subtask in order to tease out whether comprehension difficulties stem primarily from low reading skills or from low overall language comprehension.

3.5 FLUENCY

3.5.1 DESCRIPTION

Fluency is “the ability to read text quickly, accurately, and with proper expression” (NICHD, 2000, pp. 3–5). According to Snow and the RAND Reading Study Group (2002): “Fluency can be conceptualized as both an antecedent to and a consequence of comprehension. Some aspects of fluent, expressive reading may depend on a thorough understanding of a text. However, some components of fluency—quick and efficient recognition of words and at least some aspects of syntactic parsing [sentence structure processing]—appear to be prerequisites for comprehension” (p. 13).

Fluency can be seen as a bridge between word recognition and text comprehension. While decoding is the first step to word recognition, readers must eventually advance in their decoding ability to the point where it becomes automatic; then their attention is free to shift from the individual letters and words to the ideas themselves contained in the text (Armbruster et al., 2003; Hudson, Lane, & Pullen, 2005; LaBerge & Samuels, 1974). Speed may also be critical due to the constraints of our short-term working memory. Working memory can only hold so much information at one time, and if we decode too slowly because we are paying attention to each individual word part, we will not have enough space in our working

memory for the whole sentence; we will forget the beginning of the text sequence by the time we reach the end. If we cannot hold the whole sequence in our working memory at once, we cannot extract meaning from it (Abadzi, 2006; Hirsch, 2003).

Like comprehension, fluency itself is a higher-order skill requiring the complex and orchestrated processes of decoding, identifying word meaning, processing sentence structure and grammar, and making inferences, all in rapid succession (Hasbrouck & Tindal, 2006). It develops slowly over time and only from considerable exposure to connected text and decoding practice.

Numerous studies have found that reading comprehension correlates to fluency, especially in the early stages (Fuchs, Fuchs, Hosp, & Jenkins, 2001) and for individuals learning to read in a language they speak and understand. For example, tests of oral reading fluency, as measured by timed assessments of correct words per minute, have been shown to have a strong correlation (0.91) with the reading comprehension subtest of the Stanford Achievement Test (Fuchs et al., 2001). Data from many EGRA administrations across contexts and languages have confirmed the strong relationship between these two constructs (Bulat et al., 2014; LaTowsky, Cumiskey, & Collins, 2013; Management Systems International, 2014; Pouezevara, Costello, & Banda, 2012; among many others). The importance of fluency as a predictive measure does, however, decline in the later stages as students learn to read with fluency and proficiency. As students become more proficient and automatic readers, vocabulary becomes a more important predictor of later academic success (Yovanoff, Duesbery, Alonzo, & Tindall, 2005).

How fast is fast enough? While it is theorized that a minimum degree of fluency is needed in order for readers to comprehend connected text, fluency benchmarks will vary by grade level and by language. A language with shorter words on average, like English or Spanish, allows students to read more words per minute than a language like Kiswahili, where words can consist of 10–15 or even 20 letters. In other words, the longer the words and the more meaning they relay, the fewer the words that need to be read per minute.

3.5.2 MEASURES OF FLUENCY

Given the importance of fluency for comprehension, EGRA’s most direct measurement of fluency, the oral reading fluency with comprehension subtask, is a core component of the instrument. Children are given a short, written passage on a familiar topic and asked to read it out loud “quickly but carefully.” Fluency comprises speed, accuracy, and expression (prosody). The oral reading fluency subtask is timed and measures speed and accuracy in terms of the number of correct words read per minute. This subtask does not typically measure expression.

Besides the oral reading fluency subtask, several other EGRA subtasks discussed above are timed and scored for speed and accuracy in terms of correct letters (or sounds and syllables) or words per minute: letter name identification, letter sound identification, nonword reading, and familiar word reading. Because readers become increasingly more fluent as their reading skills develop, timed assessments help to track this progress across all these measures and show where children are on the path to skilled reading.

3.6 COMPREHENSION

3.6.1 DESCRIPTION

Comprehension is the ultimate goal of reading. It enables students to make meaning out of what they read and use that meaning not only for the pleasure of reading but also to learn new things, especially other academic content. Reading comprehension is also a highly complex task that requires both extracting and constructing meaning from text. Reading comprehension relies on a successful interplay of motivation, attention, strategies, memory, background topic knowledge, linguistic knowledge, vocabulary, decoding, fluency, and more, and is therefore a difficult construct for any assessment to measure directly (Snow & the RAND Reading Study Group, 2002).

3.6.2 MEASURES OF READING COMPREHENSION

EGRA measures reading comprehension through the oral reading passage subtask, based on the short paragraph that children read aloud for the oral reading fluency subtask. After children read the passage aloud, they are asked three to five comprehension questions, both explicit and inferential, that can be answered only by having read the passage. Lookbacks—i.e., referencing the passage for the answer—may be permitted to reduce the memory load but are not typically used in the core instrument.

4 EGRA INSTRUMENT DESIGN

This section discusses the structure and requirements necessary for designing or modifying an EGRA for any given context, with specific information relevant to Zambia. The text throughout this section of the toolkit explains the various subtasks, included in the EGRA instrument used in the USAID Education Data Activity 2018, by providing subtask descriptions and specific construction guidelines.

4.1 ADAPTATION WORKSHOP

The first adaptation step is to organize an in-country workshop. This subsection reviews the steps for preparing and delivering an EGRA adaptation workshop and provides an overview of the topics covered, based on experience from the 2018 EGRA baseline conducted by the USAID Education Data Activity.

The adaptation workshop can be conducted over a period of four to five days. This in-country adaptation workshop is held at the start of the test development (or modification) process for EGRA instruments. It provides an opportunity to build content validity into the instrument by having government officials, curriculum experts, and other relevant groups examine the EGRA subtasks and make judgments about the appropriateness of each item type for measuring the early reading skills of their students, as specified in curriculum statements or other guidelines that state learning expectations or standards.¹⁰ As part of the adaptation process, the individuals participating in the workshop adapt the EGRA template as necessary and prepare country-appropriate items for each subtask of the test. This approach ensures that the assessment has face validity. Following the workshop, piloting of the instrument in a school is essential.

The objectives of the adaptation workshop are:

- Give both government officials and local curriculum and assessment specialists a grounding in the research backing of the instrument components
- Adapt the instrument to local conditions using the item-construction guidelines provided in this toolkit, including
 - Translating the instrument instructions;
 - Developing versions in appropriate languages, if necessary; and
 - Modifying the word and passage reading components to reflect locally and culturally appropriate words and concepts.

Table I more clearly defines the differences between development and modification workshops. If a country-specific EGRA is being developed for the first time, it is considered an adaptation development; if EGRA has already been conducted in country, then the workshop is an adaptation modification. Given the extensive prior use of EGRAs in Zambia, the USAID Education Data Activity in 2018 led an adaptation modification workshop.

¹⁰ The degree to which the items on the EGRA test are representative of the construct being measured is known as test-content-related evidence (i.e., early reading skills in a particular country).

TABLE 1: DIFFERENCES BETWEEN EGRA DEVELOPMENT AND MODIFICATION

DEVELOPMENT OF NEW INSTRUMENT	MODIFICATION OF EXISTING INSTRUMENTS
Language analysis	Language analysis (optional)
Item selection	Item re-ordering / randomization
Verification on instructions	Verification of instructions
Pretesting	Pretesting

4.1.1 OVERVIEW OF WORKSHOP PLANNING CONSIDERATIONS

Whether designing a country-specific EGRA instrument from the beginning (development) or from an existing model (modification), the team will need to make sure the instrument is appropriate for the language(s), the grade levels involved in the study, and the research questions at hand.

The development of the instrument will require a selection of appropriate subtasks and subtask items. Further considerations include:

- The agenda must allow for limited field testing of the instrument as it is being developed, which includes taking participants (either a subgroup or all) to nearby schools to use the draft instrument with students. This field testing allows participants a deeper understanding of the instrument as well as a rough test of the items to gauge any obvious changes that may be needed (such as revisions to ambiguous answer choices or overly difficult vocabulary). Alternatively, the instrument can be piloted after the workshop.
- Some of the language analysis that is necessary to draft items can be done in advance, along with translation of the directions, which must remain standardized across countries. For purposes of standardization, all students must be given the same opportunities regardless of assessor or context; therefore, it is required to keep the instructions the same across all countries and contexts.
- If the workshop cannot be done in the region where testing will take place, the study team must arrange for a field test afterward, or find a group of nearby students who speak the language and who are willing to participate in a field test during the workshop. For either arrangement, the field test team will need to monitor the results and report back to the full group. In the case of the 2018 EGRA, adapted subtasks were piloted by the USAID Education Data Activity after the workshop with a group of trained enumerators drawn from the participants in the workshop.
- The most difficult part of adaptation is usually story writing, so it is important not to leave this subtask until the last day. This step involves asking local experts to write short stories using grade-level appropriate words, as well as to write appropriate comprehension questions to accompany the stories. Both the stories and the questions often need to be translated into English or another language for review by additional early-grade reading experts, and revised multiple times in the language of assessment before finalization.
- Another important consideration in planning a workshop is how many different versions of each subtask need to be developed. This will depend on how many languages will be used but also whether the workshop will develop multiple versions of each subtask for multiple operational data collections. Ideally, for each subtask, at least three versions are developed so that the version with the best psychometric properties based on a pilot can be used in the operational data collection. It may also be necessary to develop multiple versions that can be used in more than one

operational data collection (e.g., baseline and midline). Again, the pilot would be used to identify the versions with the best psychometric properties.

4.1.2 WHO PARTICIPATES?

For Zambia, groups composed of government staff, teacher trainers, former or current teachers, and language experts from curriculum development center and local colleges and universities offer a good mix of experience and knowledge—important elements of the adaptation process. However, the number of participants in the adaptation workshop is determined by the availability of government staff to participate. Their presence is recommended in order to build capacity and help ensure sustainability for the assessment. The number of participants depends in part on the number of languages (seven in the case of Zambia) involved in the adaptation process for a given study, but in general, 30 is a recommended maximum.

Workshop participants always include:

1. **Language experts:** To verify the instructions that have been translated, to guide the review of items selected, and to support the story writing or modifications. In Zambia the EGRA is administered in seven local languages (Citonga, Cinyanja, Icibemba, Kiikaonde, Lunda, Luvale and Silozi), thus language experts for all languages are required
2. **Non-government practitioners:** Academics (reading specialists, in particular), and current or former teachers (with a preference for reading teachers)
3. **Government officials:** Experts in curriculum development, assessment
4. A psychometrician or test-development experts

Ideally, key government staff participates throughout the entire adaptation, assessor training, and piloting process spread over one month in total, depending on the number of schools to be sampled. Consistency among participants is needed so the work goes forward with clarity and integrity while capacity and sustainability are built.

The workshop is typically facilitated by a team of at least two experts. Both workshop leaders must be well versed in the components and justifications of the assessment and be adept at working in a variety of countries and contexts.

- **Assessment expert**—is responsible for leading the adaptation of the instrument and later, guiding the assessor training and data collection; has a background in education survey research and in the design of assessments/tests. This experience includes basic statistics and a working knowledge of spreadsheet software such as Excel and a statistical program such as SPSS or Stata.
- **Early literacy expert**—is responsible for presenting reading research and pedagogical/instruction processes; has a background in reading assessment tools and instruction.

4.1.3 WHAT MATERIALS ARE NEEDED?

Materials for the adaptation workshop include:

- Paper and pencils with erasers for participants
- LCD projector, whiteboard, and flipchart (if possible, the LCD projector should be able to project onto the whiteboard for simulated scoring exercises)

- Current national or local reading texts, appropriate for the grade levels and the languages to be assessed (these texts will inform the vocabulary used in story writing and establish the level of difficulty)
- Paper copies of presentations and draft instruments
- Presentation on the EGRA-related reading research, development process, purpose, uses, and research background
- Samples of EGRA oral reading fluency passages, comprehension questions, and listening comprehension questions from other countries; or for modification, copies of the previous in-country EGRA instrument.
- A sample agenda for the adaptation and research workshop is presented in Table 2

TABLE 2: SAMPLE AGENDA

DAY 1	DAY 2	DAY 3	DAY 4
Welcome, opening remarks, and EGRA overview	Review previous day Presentations/sharing	Review previous day Presentations/sharing	Review previous day
Overview of EGRA subtasks and specifications	Developing EGRA subtasks/reading passages and items	Developing EGRA subtasks/listening passages and items	Developing EGRA subtasks/non-word reading
Assessing fluency and developing passages	Developing EGRA subtasks/reading passages and items	Developing EGRA subtasks/syllable naming	Finalize subtasks and instructions
Developing EGRA subtasks/reading passages and items	Developing EGRA subtasks/listening passages and items	Developing EGRA subtasks/syllable naming	Review SSME tools

Note: Adapted from the August 2018 tools development workshop for the USAID Education Data Activity EGRA. Note that this agenda was tailored to the adaptation needs for this particular EGRA.

4.1.4 ADAPTATION WORKSHOP OUTPUTS

If there are two separate Waves of EGRAs over a period of time, then, the adaptation workshop should produce at least a minimum of three versions of instruments for the six reading subtasks in each of the languages targeted for EGRA. Based on the results of field testing, one version of each subtask in each language could be used for Wave 1 (or baseline) and the other for Wave 2 (or midline/endline). Table 3 below details the instruments that should be developed at the adaptation workshop.

TABLE 3: INSTRUMENTS TO BE DEVELOPED AT ADAPTATION WORKSHOP

SUBTASK	INSTRUMENTS DEVELOPED FOR EACH LANGUAGE (EXCEPT ENGLISH)
Listening comprehension	3 passages (30-45 words) and 5 listening comprehension questions for each of the 3 passages.
Letter sound identification	Used existing letter-sound task, with letters scrambled – no new development needed.
Syllable fluency	3 versions of subtask (100 syllables each). Two versions were unique, and the third version used the first 50 syllables from one version and the first 50 syllables of the second version.
Non-word reading	3 versions of the subtask (50 non-words each). Two versions each comprised 25 new non-words and 25 non-words from the 2016 version of the task. A third version with all 50 new non-words.

Oral reading passage	3 reading passages (up to 60 words each).
Reading comprehension	5 comprehension questions for each of the 3 reading passages developed for the oral reading fluency subtask.
English listening comprehension	3 passages (30-45 words) and 5 listening comprehension questions for each of the 3 passages.

Based on Table 3, altogether, 21 versions of the syllable naming, 21 versions of the non-word reading subtasks, 21 reading passages, 105 reading comprehension questions, 21 listening passages in local languages, 105 listening comprehension questions in local languages, 3 English listening passages, and 15 English listening comprehension questions need to be produced. As explained in Section 7, the instruments should be pilot tested, then the pilot data should be analyzed to select final instruments for the baseline and midline.

4.2 REVIEW OF THE ZAMBIAN INSTRUMENT COMPONENTS

The initial EGRA design was developed with the support of experts from USAID, the World Bank, and RTI. Over the years, expert consultations have led to a complete EGRA application in English that has been continually reviewed and updated. The EGRA instruments used for the 2018 baseline conducted with Grade 2 learners were an updated version of earlier EGRAs conducted in 2014 and 2018 in Zambia. Both of these prior EGRAs were adapted versions of the standard EGRA.¹¹ The 2018 baseline EGRA included all the subtasks in the two earlier versions. But, since Zambian languages are syllabic in nature, the 2018 baseline EGRA also included an additional subtask of syllable fluency. As a result, the 2018 baseline EGRA included the following subtasks:

- Listening comprehension (local language)
- Letter sound identification
- Syllable fluency
- Non-word reading
- Oral reading passage with oral reading fluency and reading comprehension
- English oral vocabulary
- English listening comprehension.

It is important to note that the instrument and procedures presented here have been demonstrated to be a reasonable starting point for assessing early-grade reading (see NICHD, 2000; and Dubeck & Gove, 2015). That is, the skills measured by the EGRA are essential but not sufficient for successful reading: EGRA covers a significant number of the predictive skills but not all skills or variables that contribute to reading achievement. For example, EGRA does not measure a child's background knowledge, motivation, attention, memory, reading strategies, productive vocabulary, comprehension of multiple text genres, or retell fluency. No assessment can cover all possible skills, as it would be exceptionally long, causing students to become fatigued and perform poorly. The instrument should not be viewed as sacred in terms of its component parts, but it is recommended that variations, whether in the task components or in the

¹¹ Previous EGRAs in Zambia included the orientation to print subtask but this was not included in the 2018 EGRA. Instead, the syllable fluency subtask was included.

procedures, be justified, documented in terms of the purpose and use of the assessment, and shared with the larger community of practice.

TABLE 4: REVIEW OF ZAMBIAN INSTRUMENT COMPONENTS

SUBTASK	EARLY READING SKILLS	SKILL DEMONSTRATED BY STUDENTS' ABILITY TO
1. Listening comprehension	Listening comprehension, oral language	Respond to literal and inferential questions about a text the assessor reads to them
2. Letter sound identification	Alphabet knowledge	Provide the sound of letters presented in both upper and lower case in a random order
3. Syllable fluency	Phonemic awareness	Provide the sound of syllable combinations presented in random order
4. Non-word reading	Decoding	Make letter-sound (grapheme-phoneme correspondences) through the reading of simple nonsense words
5. Oral reading passage and reading comprehension	Fluency	Read a text with accuracy, with little effort, at a sufficient rate
	Comprehension	Respond correctly to different types of questions, including literal and inferential questions, about the text they have read
6. English vocabulary	Vocabulary	Identify body parts, objects in the classroom environment, and spatial relationships indicated by the assessor
7. English listening comprehension	Listening comprehension, oral language	Respond to literal and inferential questions about a text the assessor reads to them

4.2.1 LISTENING COMPREHENSION

A listening comprehension assessment involves a passage that is read aloud by the assessor, and then students respond to oral comprehension questions or statements. This subtask in the local language can be included at the beginning of the series to ease the children into the assessment process and orient them to the language of assessment.

Testing listening comprehension separately from reading comprehension is important because it provides information about what students are able to comprehend without the challenge of decoding a text. Students who are struggling or have not yet learned to decode may still have oral language, vocabulary, and comprehension skills and strategies that they can demonstrate apart from reading text. This gives a much fuller picture of what students are capable of when it comes to comprehension. Listening comprehension tests have been around for some time and in particular, have been used as an alternative assessment for disadvantaged children with relatively reduced access to print (Orr & Graham, 1968). Poor performance on a listening comprehension tool suggests either that children lack basic knowledge of the language in question, or that they have difficulty processing what they hear.

DATA Students are scored on the number of correct answers they give to the questions asked (out of the total number of questions). Instrument designers avoid questions with only “yes” or “no” answers.

ITEM CONSTRUCTION Passage length depends on the level and first language of the children being assessed and the number of questions that will be asked, although most passages in the Zambia EGRA are be approximately 45-60 words in length in order to provide enough text to develop material for five comprehension questions. The story narrates a locally adapted activity or event that will be familiar to the children. The questions must be similar to the questions asked in the reading comprehension subtask. Most will be literal questions that can be answered directly from the text. One or two questions are inferential, requiring students to use their own knowledge as well as the text to answer the question.

Figure 6 is a sample of the listening comprehension subtask in Cinyanja. In the 2018 EGRA conducted by Education Data activity, Grade 2 learners also had a separate English listening comprehension subtask.

FIGURE 6: SAMPLE LISTENING COMPREHENSION SUBTASK (IN CINYANJA)

Sub-test 1. LISTENING COMPREHENSION		🔊 x	🗑️ x
<p>🔊 Ndidzakuweregera ka nthano/nkhani mokweza KAMODZI ndipo pambuyo pake ndidzakufunsa mafunso. Conde umvetsere mosamalitsa ndipo uyankhe mafunso mmene ungakwanitsire. Ungayankhe mafunso mcilankhulo ciriconse cimene ukonda. I am going to read you a short story aloud ONCE and then ask you some questions. Please listen carefully and answer the questions as best as you can. You can answer the questions in whichever language you prefer. Ready? Let's begin.</p>		<p>Remove the pupil stimuli booklet from the child's view.</p>	
<p>🗑️ (✓) 1 = Correct (✗) 0 = Incorrect (.) = No response.</p>		<p>Do not allow the child to look at the passage or the questions.</p>	
<p>Woimba anali kupita kukaimba kunyumba ya mfumu. Mikango yambiri inali kukhala mnjira yopita kunyumba ya mfumu. Mnjira, woimba anakumana ndi mkango wolusa. Woimba anayamba kuliza banjo. Mkango unagona. Mkango waciwiri naonso unagona. Pamene woimba anakumana ndi mkango wacitatu, anayamba kuimba banjo koma mkango unapitiliza kufendera pafupi. Woimba anacunguluka ndi kuthawa. Anthu amalola aja anamuza kuti mkango uyu siunali kumva.</p>		<p>If a child <u>says</u> "I don't know," mark as incorrect.</p>	
1. Kodi woimba anali kupita kuti? (kunyumba ya mfumu)	1	0	.
2. Kodi ndi nyama zotani zomwe zinali kukhala mnjira yopita kunyumba ya mfumu? (mikango)	1	0	.
3. Kodi ndi ciani cimene cinacitika ku mikango iwiri yoyamba pamene woimba analiza banjo lake? (mikango inagona)	1	0	.
4. Kodi mkango wacitatu unacita ciani pamene woimba analiza banjo? (mkango unapitiliza kufendera pafupi ndi woimba)	1	0	.
5. Cifukwa mkango wacitatu sunamve kulira kwa banjo ya woimba ? (mkango sunamve ciri conse /unali wogontha)	1	0	.

Wacita bwino! Tiye tipitirize patsamba lotsatira Good effort! Let's go on to the next section.

Source: USAID Education Data Activity, 2018 EGRA.

4.2.2 LETTER SOUND IDENTIFICATION

Knowledge of how letters correspond to sounds is another critical skill children must master to become successful readers. Letter–sound correspondences are typically taught through phonics-based approaches. Letter-sound identification tests the actual knowledge students need to have to be able to decode words—i.e., knowing the sound the letter represents allows students to sound out a word.

In this subtask, students are asked to produce the sounds of all the letters, plus digraphs and diphthongs (e.g., in English: th, sh, ey, ea, ai, ow, oy), from the given list, within a one-minute period. For letters, the full set of letters of the alphabet is listed in random order, 10 letters to a row, using a clear, large, and familiar font. For example, Century Gothic in Microsoft Word is like the type used in many children's textbooks; also, SIL International has designed a font called Andika specifically to accommodate beginning

readers.¹² The number of times a letter is repeated is based on the frequency with which the letter occurs in the language in question. The complete alphabet (using a proportionate mixture of both upper and lower case) is presented based on evidence from European languages that student reading skills advanced only after about 80 percent of the alphabet is known (Seymour, Aro, & Erskine, 2003).

Letter-frequency tables will depend on the text being analyzed (a report on x-rays or xylophones will show a higher frequency of the letter x than the average text). Test developers constructing instruments in other languages sample 20–30 pages of a grade-appropriate textbook or supplementary reading material and analyze the frequency of letters electronically to develop similar letter frequency tables.

Developing a letter-frequency table requires typing the sampled pages into a word- processing program and using the “Find” command. Enter the letter “a” in the “Find what” search box and set up the search to highlight all items found in the document. In the case of Microsoft Word, it will highlight each time the letter “a” appears in the document and will report the number of times it appeared (in the case of this section of the toolkit, for example, the letter “a” appears over 3,500 times). The analyst will repeat this process for each letter of the alphabet, recording the total number for each letter until the proportion of appearances for each letter can be calculated as a share of the total number of letters in the document.

Pronunciation issues need to be handled with sensitivity in this and other subtasks. The issue is not to test for correct pronunciation. The assessment tests automaticity using a pronunciation that may be common in a given region or form of the language of the adaptation. Thus, regional accents are acceptable in judging whether a letter sound is pronounced correctly.

For letters that can represent more than one sound, several answers will be acceptable. During training, assessors and supervisors, with the help of language experts, carefully review possible pronunciations of each letter and come to agreement on acceptable responses, giving careful consideration to regional accents and differences. For a complete listing of characters and symbols in international phonetic alphabets, please see the copyrighted chart created and maintained by the International Phonetic Association at <http://westonruter.github.io/ipa-chart/keyboard/>.

DATA The child’s score for this subtask is calculated as the number of correct letter sounds read per minute. If the child completes all of the letter sounds and digraphs/diphthongs before the time expires, the time of completion is recorded, and the calculations based on that time period. In the event that paper assessments must be used, assessors mark any incorrect letters with a slash (/), place a bracket ([]) after the last letter named, and record the time remaining on a stopwatch at the completion of the exercise. Electronic data capture does the marking and calculations automatically based on assessors’ taps on the tablet screen. Three data points are used to calculate the total correct letter sounds and diphthongs/digraphs per minute (clspm):

$$clspm = (Total\ letter\ sounds\ identified - Total\ incorrect) / [(60 - time\ remaining) / 60]$$

Each of these data points can also be used for additional analyses. For example, information on the total number of sounds identified will allow for differentiation between a student who names 50 sounds within

¹² More about Andika, including how to download this font, can be found on SIL’s website: http://scripts.sil.org/cms/scripts/page.php?site_id=nrsi&id=andika

a minute but names only half of them correctly; and a student who names only 25 sounds within a minute, but names all of them correctly.

Note that this subtask, as well as many of the subtasks that follow it, is not only timed but also time-limited (i.e., stopped after a specified period, whether completed or not). The time limitation is useful in making the assessment shorter, and is also less stressful for both child and assessor, as the child does not have to keep trying to do the whole task at a slow pace. In addition, timing helps to assess automaticity.

ITEM CONSTRUCTION This subtask consists of 100 total items. Letters of the alphabet are distributed randomly, with 10 letters to a line in horizontal rows, and evenly distributed among upper- and lowercase letters. Most of the characters will be presented multiple times. The percentages calculated in the exercise above act as a guide for the frequency with which the letters, diphthongs, and/or digraphs appear in the task sheet.

It is not uncommon for an existing EGRA instrument to need to be modified into one or more parallel versions, for example, for purposes of monitoring gains from baseline to midterm or endline. Under such scenarios, items in some subtasks are reordered, or re-randomized, to create new grids—e.g., 10 rows of 10 letters—without frequencies having to be recalculated. In these cases, to ensure equivalent test forms, it is important that the reordering occur only within the individual rows (in order to retain relative subtask difficulty).¹³ In other words, each item in the grid remains in the same row in which it appeared in the previous instrument.

Figure 7 is a sample of the letter sound identification subtask, the version designed for 2018 EGRA.

¹³ While reordering within rows will limit significant changes in subtask difficulty, it is still recommended to test for order effects whenever possible.

FIGURE 7: SAMPLE LETTER SOUND IDENTIFICATION SUBTASK (IN SILOZI)

Sub-test 2. LETTER SOUND IDENTIFICATION	Page 1	60 seconds																																																																																																																									
<p>Ki le likepe lelitezi litaku za Silozi. Unibulelele milumo ya litaku ze ka moukonela kaufela. Isifi mabizo azona, kono milumo yazona. Here is a page full of letters of the Silozi alphabet. Please tell me the SOUNDS of as many letters of the alphabet as you can. Not their names, but their sounds.</p> <p>[point to the letter A] Ka mutala, mulumo wa taku yeki /A/. For example, the sound of this letter is /A/.</p> <p>[point to the letter p] Halulike: Ni bulelele mulumo wa taku ye! Let's practice: Tell me the sound of this letter.</p> <p>Ki hande, mulumo wa taku ye ki /p/. Good, the sound of this letter is /p/.</p> <p>Mulumo wa taku ye ki/p/. The sound of this letter is /p/.</p> <p>[point to the letter L] Cwale lika yeñwi: Nibulelele mulumo wa taku ye. Now let us try another one. Tell me the sound of this letter.</p> <p>Ki hande, mulumo wa taku ye ki/L/. Good, the sound of this letter is /L/.</p> <p>Mulumo wa taku ye ki/L/. The sound of this letter is /L/.</p> <p>[point to first letter] Hanikabulela kuli "kala", ukalele fa, ni kuteza likepe kauteta. Usupe taku ni kunibulelela mulumo wa taku yeo ka kutiisa. Haiba ufitu fa taku yeusazibi mulumo, uye kuyetatama. Beya munwana wahao fa taku yapili. Uitikisize? Kala. When I say "Begin," start here and go across the page. Point to each letter and tell me the sound of that letter in a loud voice. Read as quickly and carefully as you can. If you come to a letter you do not know, go on to the next letter. Put your finger on the first letter. Ready? Begin.</p> <p>(/) Mark any incorrect letters with a slash (Ø) Circle self-corrections if you already marked the letter incorrect (]) Mark the final letter read with a bracket</p> <p>Examples: A p L</p> <table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th><th>8</th><th>9</th><th>10</th><th></th> </tr> </thead> <tbody> <tr> <td>a</td><td>W</td><td>T</td><td>u</td><td>N</td><td>B</td><td>e</td><td>a</td><td>K</td><td>u</td><td>(10)</td> </tr> <tr> <td>n</td><td>u</td><td>B</td><td>t</td><td>s</td><td>A</td><td>t</td><td>n</td><td>b</td><td>A</td><td>(20)</td> </tr> <tr> <td>E</td><td>A</td><td>l</td><td>a</td><td>O</td><td>I</td><td>E</td><td>A</td><td>m</td><td>N</td><td>(30)</td> </tr> <tr> <td>u</td><td>i</td><td>Z</td><td>h</td><td>K</td><td>Z</td><td>Y</td><td>u</td><td>I</td><td>A</td><td>(40)</td> </tr> <tr> <td>e</td><td>a</td><td>l</td><td>b</td><td>I</td><td>E</td><td>S</td><td>e</td><td>w</td><td>M</td><td>(50)</td> </tr> <tr> <td>l</td><td>i</td><td>E</td><td>o</td><td>t</td><td>O</td><td>T</td><td>I</td><td>a</td><td>l</td><td>(60)</td> </tr> <tr> <td>f</td><td>ñ</td><td>a</td><td>L</td><td>a</td><td>n</td><td>a</td><td>L</td><td>n</td><td>U</td><td>(70)</td> </tr> <tr> <td>u</td><td>e</td><td>i</td><td>N</td><td>k</td><td>U</td><td>m</td><td>u</td><td>k</td><td>H</td><td>(80)</td> </tr> <tr> <td>A</td><td>m</td><td>a</td><td>U</td><td>b</td><td>i</td><td>B</td><td>A</td><td>p</td><td>L</td><td>(90)</td> </tr> <tr> <td>o</td><td>C</td><td>z</td><td>k</td><td>a</td><td>w</td><td>l</td><td>o</td><td>I</td><td>A</td><td>(100)</td> </tr> </tbody> </table>		1	2	3	4	5	6	7	8	9	10		a	W	T	u	N	B	e	a	K	u	(10)	n	u	B	t	s	A	t	n	b	A	(20)	E	A	l	a	O	I	E	A	m	N	(30)	u	i	Z	h	K	Z	Y	u	I	A	(40)	e	a	l	b	I	E	S	e	w	M	(50)	l	i	E	o	t	O	T	I	a	l	(60)	f	ñ	a	L	a	n	a	L	n	U	(70)	u	e	i	N	k	U	m	u	k	H	(80)	A	m	a	U	b	i	B	A	p	L	(90)	o	C	z	k	a	w	l	o	I	A	(100)	<p>Start the timer when the child reads the first letter.</p> <p>If a child hesitates or stops on a letter for <u>3</u> SECONDS, point to the next letter and say "Go on"</p> <p>When the timer reaches 0, say "stop."</p> <p>If the child does not provide a single correct response on the first line (10 items), say "Thank you!", discontinue this subtask, check the box at the bottom, and go on to the next subtask.</p>
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Source: USAID Education Data Activity, 2018 EGRA.

4.2.3 SYLLABLE FLUENCY

The syllable fluency subtask, also referred to as syllable naming or syllable identification, is sometimes used in contexts where the language has primarily open (i.e., vowel-final) syllables and/or where the reading pedagogy in that language stresses syllabic combinations, as in Zambia's local languages (Gove and Wetterberg, 2011). In this subtask, students are asked to produce the sounds of common syllables in the language from the given list, presented in a grid format, within a one-minute period.

DATA The child's score for this subtask is calculated as the number of correct syllables read per minute. If the child completes all of the syllables before the time expires, the time of completion is recorded, and the calculations based on that time period. In the event that paper assessments must be used, assessors mark any incorrect syllables with a slash (/), place a bracket (]) after the last syllable read, and record the time remaining on a stopwatch at the completion of the exercise. Electronic data capture does the marking and calculations automatically based on assessors' taps on the tablet screen. Three data points are used to calculate the total correct syllable sounds per minute (csspm):

$$csspm = (Total\ syllables\ read - Total\ incorrect) / [(60 - time\ remaining) / 60]$$

Each of these data points can also be used for additional analyses, similar to that for the letter sound subtask.

ITEM CONSTRUCTION This subtask consists of 100 total syllables. Frequently used syllables are presented in a grid with 10 to a line in horizontal rows in a manner similar to that for letter-sound. Syllables are all presented in lower case.

Figure 8 is a sample syllable fluency subtask.

FIGURE 8: SAMPLE SYLLABLE FLUENCY (IN LUNDA)

Sub-test 3. SYLLABLE	Page 2	60 seconds																																																																																																																									
<p>lyi hipeji yayikunku yamazu yitwazatishaña mu Lunda. Tañaku yikunku yamazu yiwukutwasha. Here is a page full of syllables. Please read as many syllables as you can.</p> <p>[point to the syllable ba] Twesekezhi, ichi chikunku chezu [inyikaku ba] hi “ba” neyi mwizu da /ba/. For example, this syllable is /ba/.</p> <p>[point to the syllable we] Twaya tudizi :Tañaku ichi chikunku chezu [inyikaku we]: Let’s practice: Read this syllable.</p> <p>✓ Wunakiwani, ichi chikunku chezu hi /we/. Good, this syllable is /we/.</p> <p>✗ Ichi chikunku chezu hi /we/ This syllable is /we/.</p> <p>[point to the syllable si] Ichi tweseke chikwawu nawa: Tañaku ichi chikunku chezu. Now let us try another one. Read this syllable.</p> <p>✓ Wunakiwani, ichi chikunku chezu hi /si/. Good, this syllable is /si/.</p> <p>✗ Ichi chikunku chezu hi /si/. This syllable is /si/.</p> <p>[point to first syllable] Neyi nahoshi nami “Tachikaku”, tachikilaku hanu nakuya kabadi kakwawu kachipapilu. Inyikaku chikunku hichikunku chezu nakuchitañila hewulu. Wutañi swayi nakashinshi kakeni. Neyi wukuwana chikunku chezu chiwunabuli kwiluka, yaku hachikunku chezu chinalondeluhu. Shaku munu weyi hachikunku chezu chatachi. Wunadiloñeshi dehi? Tachikaku. When I say “Begin,” start here and go across the page. Point to each syllable and say that syllable in a loud voice. Read as quickly and carefully as you can. If you come to a syllable you cannot say, go on to the next one. Put your finger on the first syllable. Ready? Begin.</p> <p>⊘ (/) Mark any incorrect syllables with a slash (Ø) Circle self-corrections if you already marked the syllable incorrect () Mark the final syllable read with a bracket</p> <p>Examples: ba we si</p> <table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th><th>8</th><th>9</th><th>10</th><th></th> </tr> </thead> <tbody> <tr><td>da</td><td>fo</td><td>lwa</td><td>yi</td><td>nu</td><td>pe</td><td>mpi</td><td>ha</td><td>wu</td><td>ndi</td><td>(10)</td></tr> <tr><td>mpe</td><td>ji</td><td>ma</td><td>ta</td><td>mwa</td><td>Zho</td><td>yu</td><td>fwa</td><td>ga</td><td>la</td><td>(20)</td></tr> <tr><td>be</td><td>sha</td><td>da</td><td>ka</td><td>wo</td><td>fa</td><td>ja</td><td>ve</td><td>te</td><td>cha</td><td>(30)</td></tr> <tr><td>go</td><td>le</td><td>pwa</td><td>fe</td><td>nya</td><td>he</td><td>lo</td><td>za</td><td>kwe</td><td>sa</td><td>(40)</td></tr> <tr><td>la</td><td>kwí</td><td>bi</td><td>mpa</td><td>zhu</td><td>no</td><td>dwi</td><td>se</td><td>lwe</td><td>ju</td><td>(50)</td></tr> <tr><td>le</td><td>ndi</td><td>zi</td><td>ha</td><td>mwe</td><td>fi</td><td>ya</td><td>se</td><td>mba</td><td>ni</td><td>(60)</td></tr> <tr><td>ja</td><td>pu</td><td>nyu</td><td>mu</td><td>zo</td><td>cho</td><td>bu</td><td>kwe</td><td>yu</td><td>ji</td><td>(70)</td></tr> <tr><td>zhi</td><td>lwi</td><td>gu</td><td>je</td><td>wa</td><td>pa</td><td>ki</td><td>nya</td><td>pi</td><td>go</td><td>(80)</td></tr> <tr><td>fu</td><td>nda</td><td>shi</td><td>ga</td><td>ñu</td><td>va</td><td>sha</td><td>be</td><td>wo</td><td>ña</td><td>(90)</td></tr> <tr><td>sa</td><td>de</td><td>ma</td><td>cha</td><td>la</td><td>vi</td><td>fe</td><td>zu</td><td>we</td><td>mo</td><td>(100)</td></tr> </tbody> </table>		1	2	3	4	5	6	7	8	9	10		da	fo	lwa	yi	nu	pe	mpi	ha	wu	ndi	(10)	mpe	ji	ma	ta	mwa	Zho	yu	fwa	ga	la	(20)	be	sha	da	ka	wo	fa	ja	ve	te	cha	(30)	go	le	pwa	fe	nya	he	lo	za	kwe	sa	(40)	la	kwí	bi	mpa	zhu	no	dwi	se	lwe	ju	(50)	le	ndi	zi	ha	mwe	fi	ya	se	mba	ni	(60)	ja	pu	nyu	mu	zo	cho	bu	kwe	yu	ji	(70)	zhi	lwi	gu	je	wa	pa	ki	nya	pi	go	(80)	fu	nda	shi	ga	ñu	va	sha	be	wo	ña	(90)	sa	de	ma	cha	la	vi	fe	zu	we	mo	(100)	<p>Start the timer when the child reads the first syllable.</p> <p>⊘ If a child hesitates or stops on a letter for 3 SECONDS, point to the next syllable and say “Go on”</p> <p>⊘ When the timer reaches 0, say “stop.”</p> <p>⊘ If the child does not provide a single correct response on the first line (10 items), say “Thank you!”, discontinue this subtask, check the box at the bottom, and go on to the next subtask.</p>
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Chinawahi! Leka tutwalekuhu nachibalulu chikwawu. Good effort! Let’s go on to the next section.

Source: USAID Education Data Activity, 2018 EGRA.

4.2.4 NON-WORD READING

Non-word reading is a measure of decoding ability as distinct from whole word recognition or memorization, i.e., the lexical route. Many children in the early grades learn to memorize or recognize by sight a broad range of words. Exhaustion of this sight-word vocabulary at around age 10 has been associated with the “fourth-grade slump” in the United States (Hirsch, 2003). To be successful readers, children must combine both decoding and whole-word recognition skills; tests that do not include a decoding exercise can overestimate children’s ability to read unfamiliar words, as the words being tested may be part of the sight-recognition vocabulary.

DATA A child’s score is calculated as the number of correct nonwords per minute. The same categories of variables as collected for the other timed exercises are electronically collected for nonword reading: total correct words read, total incorrect words, and time remaining. Three data points are used to calculate the total correct non-words per minute (cnonwpm)

$$\text{cnonwpm} = (\text{Total nonwords read} - \text{Total incorrect}) / [(60 - \text{time remaining}) / 60]$$

ITEM CONSTRUCTION This portion of the assessment includes a list of 50 one- and two- syllable non-words, five per row, with the patterns of letters within the words adjusted as appropriate by language. Non-words follow the rules of the language, using letters in legitimate positions (e.g., in English, not “wuj” because “j” is not used as a final letter in English). Also, they are restricted to consonant-vowel combinations that are typical of the language and are not homophones of real words (e.g., in English, not “kat,” homophone of “cat”). The grid uses a clear, well-spaced font. The items within rows of the grid can be reordered (re-randomized) for preparing equivalent test forms, although testing for ordering effects is recommended.

Figure 9 is a sample non-word reading subtask.

FIGURE 9: SAMPLE NON-WORD READING (IN ICIBEMBA)

Sub-test 4. NON-WORD READING	Page 3	60 seconds																																																																								
<p> <input type="checkbox"/> Apa pali amashiwi ayakupangafye ayashilepilibula nangu cimo mu Cibemba. Ndefwaya ukuti ubelenge aya mashiwi yonse ayo wingabelenga. Wilalumbula ifilembo cimo-cimo iyoo kanofye ukubelenga ishiwi iyonse. Here are some made-up words in Icimemba. I would like you to read as many as you can. Do not spell the words, but read them. [point to the word “opa”] Icilangililo: Ili ishiwi iyapangwa iyakuti: “opa”. For example, this made-up word is: “opa”. [point to the word “toti”] Natweshe nomba: belenga ili shiwi. Let’s practice: Please read this word. <input checked="" type="checkbox"/> Eya cawama, ili ishiwi ni “toti”. Good, this made-up word is “toti.” <input checked="" type="checkbox"/> Ili ishiwi iyakupangafye “toti” talipilibula nangu cimo. This made-up word is “toti.” [point to the word “maba”] Nomba esha nalimbi: Belenga nalimbi ishiwi ili. Now let us try another one. Please read this word. <input checked="" type="checkbox"/> Ciisuma, ili ishiwi iyaku pangafye ni “maba”. Good, this made-up word is “maba.” <input checked="" type="checkbox"/> Ili ishiwi iyaku pangafye ni “maba”. This made-up word is “maba.” [point to first word] Ilyo ndetiila “Tampa” utampile apa no kubelenga yonse ayali pepepala lyonse. Uleesonta pali cila ishiwi na ukubelenga ukwikatisha ishiwi. Belenga mukwangufyanya kabili mu mutekatima. Ngawasanga ishiwi ushishibe wikokolapo uye palikonkelepo. Sonta peeshiwi iyaku balilapo. waipekanya? Tampako. When I say “Begin,” start here [point to first word] and read across the page [point]. Point to each word and read it in a loud voice. Read as quickly and carefully as you can. If you come to a word you do not know, go on to the next word. Put your finger on the first word. Ready? Begin. </p>		<p> Start the timer when the child reads the first word. If a child hesitates or stops on a letter for 3 SECONDS, point to the next word and say “Go on” When the timer reaches 0, say “stop.” If the child does not provide a single correct response on the first line (5 items), say “Thank you!”, discontinue this subtask, check the box at the bottom, and go on to the next subtask. </p>																																																																								
<p> <input type="checkbox"/> (/) Mark any incorrect words with a slash <input type="checkbox"/> (O) Circle self-corrections if you already marked the word incorrect <input type="checkbox"/> () Mark the final word read with a bracket Examples: </p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">opa</th> <th colspan="2">toti</th> <th colspan="2">maba</th> </tr> <tr> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> <th></th> </tr> </thead> <tbody> <tr> <td>cibu</td> <td>yotu</td> <td>mete</td> <td>yaka</td> <td>moti</td> <td>(5)</td> </tr> <tr> <td>nano</td> <td>sefi</td> <td>luta</td> <td>paso</td> <td>lepo</td> <td>(10)</td> </tr> <tr> <td>ceko</td> <td>noya</td> <td>puya</td> <td>wipo</td> <td>nomu</td> <td>(15)</td> </tr> <tr> <td>liko</td> <td>fubi</td> <td>kwipa</td> <td>manti</td> <td>lando</td> <td>(20)</td> </tr> <tr> <td>wace</td> <td>mawi</td> <td>lyoma</td> <td>pebwa</td> <td>nguya</td> <td>(25)</td> </tr> <tr> <td>ndwe</td> <td>kwili</td> <td>imwa</td> <td>keshi</td> <td>muuyo</td> <td>(30)</td> </tr> <tr> <td>senso</td> <td>mweti</td> <td>twape</td> <td>ekwe</td> <td>laaku</td> <td>(35)</td> </tr> <tr> <td>tashu</td> <td>yatwe</td> <td>nuunu</td> <td>feeka</td> <td>bundo</td> <td>(40)</td> </tr> <tr> <td>twayo</td> <td>nyeme</td> <td>nino</td> <td>shanu</td> <td>mwako</td> <td>(45)</td> </tr> <tr> <td>bwabe</td> <td>tanwe</td> <td>tuto</td> <td>kiko</td> <td>bita</td> <td>(50)</td> </tr> </tbody> </table>		opa		toti		maba		1	2	3	4	5		cibu	yotu	mete	yaka	moti	(5)	nano	sefi	luta	paso	lepo	(10)	ceko	noya	puya	wipo	nomu	(15)	liko	fubi	kwipa	manti	lando	(20)	wace	mawi	lyoma	pebwa	nguya	(25)	ndwe	kwili	imwa	keshi	muuyo	(30)	senso	mweti	twape	ekwe	laaku	(35)	tashu	yatwe	nuunu	feeka	bundo	(40)	twayo	nyeme	nino	shanu	mwako	(45)	bwabe	tanwe	tuto	kiko	bita	(50)	
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Eya cawama waesha! Katuleya kucipande cakonkapo. Good effort! Let’s go on to the next section.

Source: USAID Education Data Activity, 2018 EGRA.

4.2.5 ORAL READING PASSAGE AND COMPREHENSION

Oral reading fluency is a measure of overall reading competence: the ability to translate letters into sounds, unify sounds into words, process connections, relate text to meaning, and make inferences to fill in missing information (Hasbrouck & Tindal, 2006). As skilled readers translate text into spoken language, they combine these tasks in a seemingly effortless manner; because oral reading fluency captures this complex process, it can be used to characterize overall reading ability. Tests of oral reading fluency, as measured by timed assessments of correct words per minute, have been shown to have a strong correlation (0.91) with the Reading Comprehension subtest of the Stanford Achievement Test (Fuchs et al., 2001; Piper & Zuilkowski, 2015). Poor performance on a reading comprehension tool would suggest that the student may have trouble with decoding, or with reading fluently enough to comprehend, or with vocabulary.

DATA Students are scored on the number of correct words per minute and the number of comprehension questions answered acceptably. There will be two student scores: the number of words read correctly in the time allotted, and the proportion of questions correctly answered. The same three categories of variables collected for the other timed subtasks are electronically collected: total correct words read, total incorrect words, and time remaining. In addition, results for each of the comprehension questions are electronically recorded and entered into the database, with a final score variable calculated as a share of total questions asked. Data collection software prompts the assessor to ask only questions related to the text the child has read (see structure of questions and paragraph under “item construction” below).

ITEM CONSTRUCTION To create the oral reading fluency with comprehension subtask, the instrument developers review narratives from children’s reading materials. A narrative story has a beginning section where the characters are introduced, a middle section containing some dilemma, and an ending section with an action resolving the dilemma. It is not a list of loosely connected sentences. The length of the story ranges between 40 and 70 words depending on the language.

The number of words varied due to differences in the complexity of expressions used in each language. Some languages use one word to express an idea while other languages may require two or more words to express that same idea. For example, to express “Baby does not drink tea” in Citonga, three words are used, “Mwana tanywi tii.” However, in Kiikaonde the sentence is expressed in five words, “Mwana kechi utoma chii ine.” Therefore, even though Zambian languages are transparent and use consistent vowels (a, e, i, o, u) with vowel-consonant (VC), VCV, CCV, and CCCV word combinations, some languages use more words to express the same idea than other languages. As a result, even though the passages in EGRA are the same story, the number of words cannot be the same across all languages.

Character names frequently used in the school textbook are to be avoided, as students may give automated responses based on the stories with which they are familiar. However, character names must be typical of the language and context. Likewise, the story has only one to two characters, to avoid the task becoming about memory recall; and the names and places reflect the local culture.

The story text contains some complex vocabulary (inflected forms, derivations, etc.) and sentence structures. A large, clear, familiar font and good spacing between lines are used to facilitate student reading. No pictures are included.

The associated list of comprehension questions includes ones that can be answered directly from the text as well as at least one inferential question requiring students to combine knowledge and experience from outside the text to respond correctly. These inferential questions will have more than one right answer, but the answers must be logical based on the text and the context. Literal questions that are linked directly to the oral reading passage are the easiest type of comprehension measure. Including inferential questions in the subtask can provide insight into whether pupils are able to connect the passage content with their own knowledge. The protocol for the subtask will specify the types of answers that may be marked as correct.

When equivalent forms of this subtask are to be created for use across multiple implementations of the same instrument in the same language (e.g., baseline, midterm, and endline), it is recommended one option is to make simple changes in the story in order to limit the impact of test leakage, while retaining similar test difficulty. For example, names of story subjects, actions, and adjectives can be replaced with similar

grade-level alternatives. An alternative approach is to develop two passages following the same specifications and to implement a common-person equating study to allow for comparisons over time even when different passages are used. This is the approach used in the 2018 USAID Education Data Activity EGRA.

Figure 10 is a sample of the oral reading fluency subtask for the Luvale language, including the reading comprehension component.

FIGURE 10: SAMPLE ORAL READING PASSAGE WITH READING COMPREHENSION (IN LUVALE)

Sub-test 5. ORAL READING PASSAGE	0:60 seconds	Sub-test 6. READING COMPREHENSION
Show the child the sheet in the student stimulus booklet as you read the instructions.	☞ If a child hesitates or stops on a letter for ≥ SECONDS, say "Go on"	After the child is finished reading, REMOVE the passage from in front of the child.
☛ Vanakuhane mujimbu wawih. Utangile helu, muwashiwashi, oloze mujila yakwoloka. Nge unakumisa kutanga, nangukuhulisa vihula hali ovyo unatange. Nge ngwami "putuka", tanga mujimbu mujila yambwende nauhashilamo. Nge nauwana lizu lize kawathachikijileko, yako halizu likwavo. Haka munwe wove halizu lyatete. Unalizange? Putuka. Here is a short story. I want you to read it aloud, quickly but carefully. When you finish, I will ask you some questions about what you have read. When I say "Begin," read the story as best as you can. If you come to a word you do not know, go on to the next word. Put your finger on the first word. Ready? Begin.	☞ If the child does not provide a single correct word on the first line of text. Do not ask any comprehension questions.	Ask the child only the questions related to the text read. A child must read all the text that corresponds with a given question. If the child does not provide a response to a question after 10 seconds, mark "no response" and continue to the next question. Do not repeat the question.
☞ (/) Mark any incorrect letters with a slash ☞ (Ø) Circle self-corrections if you already marked the letter incorrect ☞ () Mark the final letter read with a bracket	If a child says "I don't know," mark as incorrect.	☛ Nangukuhulisa jino vihula vyavindende hamujimbu unatange. Eseka kukumbulula vihula vize nauhasa. Unahase kukumbulula vihula mulifimi unasake. Now I am going to ask you a few questions about the story you just read. Try to answer the questions as well as you can. You can provide your answers in whichever language you prefer.
		☞ (✓) 1 = Correct ☞ (✓) 0 = Incorrect ☞ (✓) . = No response.
		Questions [Answers]
Mutete apwile mumango 2 hashikola <u>venyi</u> .	6	1. Hiya apwile mumango 2? (Mutete). 1 0 .
Shikola ya Mutete yapwile musali yakalwiji. Hakalwiji hapwile chau chakutunga namitondo yaumu.	18	2. Shikola ya Mutete yapwile kulihi? (Musali yakalwiji). 1 0 .
Makumbi osena ahichilenga hachau na Chitengi. Mutete evwilenga woma hakuhita hachau ukhawenyi.	30	3. Mutete ahichilenga hachau neya? (Na Chitengi). 1 0 .
Likumbi limwe Chitengi kayile kushikolako. Mutete azangile kutanga nakwasa ngunja chikuma hashikola.	42	4. Vyuma muka azangilenga kulinga Mutete hashikola? (Kutanga nakwasa ngunja). 1 0 .
Shikaho Mutete ahichile hachau ukhawenyi nakuya kushikola.	49	5. Mwomwo ika Mutete ayile kushikola ukawenyi likumbi lwimwe? (Mwomwo Chitengi kayile kushikolako). 1 0 .
☞ Time remaining on stopwatch at completion (number of SECONDS)		
☞ Exercise discontinued: the child had no correct answers in the first line		

Unazate kanawa, tutale jino vyuma vikwavo. Good effort! Let's go on to the next section.

Source: USAID Education Data Activity, 2018 EGRA.

4.2.6 ENGLISH VOCABULARY

Oral vocabulary tests are used for assessing a child in a language of instruction that differs from their first language. Children are asked a series 5 to 20 oral questions which have a child point to or demonstrate the answer. Body parts or basic classroom materials (i.e., pencil, paper, eraser) are often words that students are asked to identify. This subtask may also incorporate spatial vocabulary questions such as under the paper, beside the paper, etc. These types of simple commands, given in a language of instruction, can indicate whether children possess basic vocabulary skills.

DATA The number correct out of the total number of words or phrases is recorded.

ITEM CONSTRUCTION Select 5 to 20 grade-appropriate vocabulary words that the student will be instructed to identify. The instructions will be read aloud by the assessor in the local language and only the actual vocabulary word(s) will be given in the language of instruction. Pictures of the words are typically avoided, and instead, students are asked to identify actual objects in front of them or body parts. After assessors provides the instructions asking the student to "point or show," they read aloud the list of vocabulary words in the language of instruction one at a time while the student demonstrates their understanding of the word. Spatial commands can also be incorporated via short phrases that instruct a

student to place his or her pencil on, next to, or under a piece of paper. Again, the general instructions are given in the first language while the phrase (for example, “on the paper” or “under the paper”) is read in the language of instruction.

Figure 11 is a sample of the English vocabulary subtask from the Zambia 2018 USAID Education Data Activity EGRA.

FIGURE 11: SAMPLE ENGLISH VOCABULARY

Sub-test 7. ENGLISH VOCABULARY		Materials: a sheet of paper, pencil, rubber	ⓧ x
✎	{ / } Mark any incorrect words with a slash { Ø } Circle self-corrections if you already marked the word incorrect		
A. Body Parts:			
🗨️	<p>Tsopano ndidzachula mau m'Cinyanja amene aimilira ziwalo za thupi. Ndionetse mbali ya thupi ndidzachula. Tiye tiyese: "nose" Say, <i>I'll say words in English that represent parts of the body. Show me what part of your body the word means. Let's practice: "nose"</i> (Point to your nose so that you model for the student) "head" Wait for the child to gesture to his/her head. Thereafter say, Wacita bwino wamvetsa malangizo! Tiye tiyambe. Good you understand the directions! Let's start.</p>		
	Shoulder	eye	back
			knee
			ear
			foot
			finger
			chin
	Part A Total Correct		/8
B. Words from the Environment:			
🗨️	<p>Tsopano ndidzachula mau ena ndipo udzandionetsa zitsanzo za mauwa. Now I will say other words and you will show me examples of those words.</p>		
	pencil	floor	paper
			rubber
			desk
			shoes
	Part B Total Correct		/6
C. Spatial Words			
🗨️	<p>Tenga phensulo iyi. (Hand the pencil to the child.) Udzaika phensulo pamene ndidzakuza kuti uyike. Ika phensulo Say, <i>Take this pencil. You will place the pencil where I tell you to put it. Put the pencil...</i></p>		Place a pencil and sheet of paper side by side in front of the student.
	In front of you	next to the paper	under the paper
			behind you
			On the paper
			to the right of the paper
	Part C Total Correct		/6
	Overall Total Correct = (Part A + Part B + Part C)		/20

Source: USAID Education Data Activity, 2018 EGRA.

4.3 TRANSLATION AND OTHER LANGUAGE CONSIDERATIONS

4.3.1 TRANSLATION VS. ADAPTATION

The consensus among education experts is that when evaluators are developing or modifying EGRA instruments, it is not viable to simply translate either the words or the connected-text passage from a version in a different language. Quite simply, translation may result in use of inappropriate words in the mother tongue that are too difficult for the grade level. For example, translating a syllable-segmenting task from English to Spanish when the word being segmented is “yesterday” would result in comparing a three-syllable word with a two-syllable word (ayer in Spanish), which would reduce the reliability of the assessment instrument and the validity of the cross-linguistic comparisons of results. As discussed earlier in this section, careful work in an adaptation workshop results in original passages that are approximately equal in difficulty to the texts students are expected to read at grade level in each context. Alternatively, passages originate in language in which they will be administered, rather than translating or adapting from

one language to another. This was the approach for the 2018 Education Data activity administered EGRA to Grade 2 learners.

The instructions must be translated as closely as possible to the original EGRA instructions, capturing the meaning more than a verbatim version.

Noted early in EGRA's development by Penelope Collins (née Chiappe) in a 2006 personal communication relating her experience within the South Africa Department of Education, because of linguistic differences (orthographic and morphological), it is critical that the passages used are independently written. Equivalence between passages cannot be established by translating the English passage into the different languages.

This was clearly illustrated by the initial pilot of the isiZulu passage. The isiZulu passage was a translation of the English passage. Although one would expect children's oral reading rate to be similar for the context-free word/nonword lists and the passage, isiZulu learners who could read 20–30 correct words per minute in the list could not read the passage at all. Closer inspection of the isiZulu passage revealed that the isiZulu words were much longer than those in the isiZulu list and the words used in the English passage. Thus, the isiZulu passage was clearly too difficult for students reading at a first-grade level.

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

IsiZulu: "USipho wayenenja encane. Inja yakhe yayikhuluphele. Ngolunye usuku uSipho wayehamba nenja yakhe ukuyodlala. Inja yalahleka. Emva kwesikhathi inja yabuya. USipho waphindela ekhaya nenja yakhe. Emva kokufika ekhaya, uSipho wapha inja ekhaya ukudla okuningi. Inja yajabula kakhulu yaze yacina ilele. NoSipho ngokunjalo wacina elele."

4.3.2 CROSS-LANGUAGE COMPARISONS

The issue of comparability across languages and countries is challenging from an assessment perspective. EGRAs administered in different contexts or in different languages may use comparable test forms meaning the tests are intended to be judged in relationship to each other and thus are designed with the same constructs and subtasks. That is, the forms themselves have the same measurement purpose; however, there is no assumption of equivalence (i.e., identical item difficulty).

Note that in the case of 2018 USAID Education Data Activity EGRA in Zambia, there were seven versions of the EGRA tool – a different version for each language. Although development of all seven versions followed the same specifications, the subtasks in different languages are not equivalent and results based on the different language versions cannot be compared directly.

Research indicates the difference between languages may be primarily a matter of the rate at which the children achieve the first few steps toward reading acquisition (Seymour et al., 2003). Regardless of language, all children who learn to read progress from being nonreaders (unable to read words) or partial readers (can read some items but not others) to readers (can read all or a majority of items). In languages with transparent or shallow orthographies (often called phonetically spelled languages), the progression

through these levels is very rapid (i.e. just a few months of learning); in languages with more complex or deeper orthographies, this process can take several years. In English, for example, completing the foundation steps requires two or more years, with a rate gain of only a few new items per month of learning. In comparison, regular and transparent languages such as Italian, Finnish, and Greek require only about a year of instruction for students to reach a comparable level (Seymour et al., 2003).

As languages have different levels of orthographic transparency, it is not easy to say that Country A (in which all children are reading with automaticity by grade 2) is outperforming Country B (where children reach this level only by grade 3), if Country A's language has a far more transparent orthography than Country B's language.

Nonetheless, finding out at which grade children are typically “breaking through” to reading in various countries, for example, and comparing these grades, could be a useful analytical and policy exercise. The need for this type of “actionable data” was one rationale behind the creation of the Early Grade Reading Barometer (<http://www.earlygradereadingbarometer.org/users/login>), an interactive tool developed with USAID funding. It uses actual EGRA data sets from dozens of countries to generate graphical displays of students' reading performance, by country, and is publicly available (free login required).

In order to make reasonable cross-linguistic comparisons, educators and policy makers must complete two steps.

First, to ensure the technical adequacy¹⁴ of an EGRA instrument across languages specifically, one must adapt, rather than translate, the instrument to account for differences in the cultural or linguistic elements of a language. Even so, directly comparing all EGRA subtask results from one language's assessment to another is not advised. Second, in the case that comparison across languages is desired, those adapting and analyzing the EGRA results must, at a minimum, conduct a thoughtful examination of:

1. The technical adequacy of an assessment for its stated purpose
2. The features of the languages, such as orthographic depth or orthographic complexity
3. Each subtask, to understand the overall and particular constructs they are attempting to capture.

For further guidelines and recommendations on how to adapt and compare EGRA results across languages, see Annex B: Recommendations and Considerations for Cross-Language Comparisons.

4.4 USING SAME-LANGUAGE INSTRUMENTS ACROSS MULTIPLE APPLICATIONS

Often, there is a need to administer an EGRA across multiple time points to monitor trends in performance. If there is no concern about test leakage (i.e., if teachers have limited access to EGRA instruments and it is unlikely that students will become familiar with a particular form of the assessment), the same instrument can simply be used across multiple time points. If leakage is a concern, it will be necessary to have multiple assessments (or test forms) that are used to measure changes in performance. In order to ensure that valid comparisons of results can be made across assessment forms/administrations, instruments must be modified in such a way as to create new forms that are as equal as possible in difficulty

¹⁴ A technically adequate instrument is one that has been demonstrated to produce reliable results, allows the generation of valid analyses, and therefore lends confidence

to the original form. Equivalent test forms refer to tests that are intended to be of equal difficulty and thus directly substitutable for one another.

One approach is to make very few changes to the original subtask. For example, this could include making simple changes in the names of story subjects, actions, and adjectives, replacing them with grade-level equivalents. For subtasks that are presented to learners on stimuli sheets that are in a grid format, shuffling or scrambling items within the grid rows. Over time, though, with multiple uses of the same subtasks or the same subtasks with only minor changes, the implications of test leakage are greater. Another approach is to develop new subtasks following the same specifications and with the goal of achieving the same level of difficulty.

In either case, where subtask difficulty from EGRA instrument A and instrument B is determined post-test not to be equal, specific test equating procedures (e.g., common item equating design for untimed subtasks and common person equating design for oral reading fluency passages and comprehension) can be applied to account for the differences. Equated test forms refer to forms that have been adjusted by a statistical process in order to make scores comparable.

In the 2018 USAID Education Data Activity administered EGRA to Grade 2 learners, for the letter-sound and English vocabulary subtasks, versions of the subtasks used in a previous EGRA in Zambia were modified by scrambling the letters and words presented therefore no equating is necessary. Syllable fluency was a new subtask and was created for the 2018 USAID Education Data Activity administered EGRA, therefore common item equating design is to be used for this subtask. For the reading and listening comprehension subtasks, new passages and associated items were developed and replaced those used in previous EGRAs, and will use common person equating.

4.5 BEST PRACTICES

As EGRA has expanded into dozens of countries and even more languages, many lessons have been learned that are worth bearing in mind in the planning and execution of both adaptation development and adaptation modification in Zambia.

- **INSTRUCTIONS** Debating the EGRA protocol, or the instructions the assessors are to follow, is unproductive. The instructions are carefully developed based on evidence from prior research and experience and are never modified. Instead, time spent on accurate translation of the instructions is critical for successful implementation.
- **PILOT TESTING** Collecting data on the psychometric properties of subtasks that are developed is an essential step and must be planned and budgeted.
- **MINIMUM CONTENT** At a minimum, an EGRA must test listening comprehension, letter sounds, non-word reading, and oral reading fluency with comprehension; other subtasks depend on contextual factors.
- **APPLICATION OF EQUATING TECHNIQUES TO ADJUST FOR DIFFERENCES IN DIFFICULTY** While strong instrument design procedures can produce highly comparable forms to be used across multiple administrations, test equating should be used to account for differences in difficulty. Common item or common person equating designs, incorporated into the EGRA in advance of an administration, is recommended.

5 USING ELECTRONIC DATA COLLECTION

Starting in 2010, EGRA researchers around the world began to transition from paper-based data collection to electronic data collection. Electronic data collection reduces the potential for errors or omissions in the data and makes results available more rapidly.

Comparisons of electronic versus paper-based data collection have shown advantages in terms of effectiveness and efficiency. The increasing availability of affordable mobile devices and Internet connectivity that allow researchers to analyze data in real time continue to drive support for e-data capture (Walther et al., 2011).

A key difference between electronic and paper-based data collection is the elimination of manual data entry of completed paper forms into an electronic database. This reduces time spent and potential errors associated with manual data entry from paper, as well as errors that result from assessors incorrectly or illegibly marking paper forms or skipping questions. Moreover, electronic data collection results can be uploaded from the field, processed, and analyzed sooner. This feature also provides an opportunity to detect and rectify issues while assessors are still collecting data. Electronic data collection therefore improves and strengthens data collection.

It is important to keep in mind that electronic data collection does not change the basic implementation procedures of the assessment. The child still reads from a sheet of paper with the letters and words printed on it; the assessor still provides the same instructions. The instructions for electronic data collection do not change except in reference to how to mark responses (e.g., “mark” versus “touch the screen”).

The first known examples of wireless mobile data collection designed specifically for EGRA were iProSurveyor, developed by Prodigy Systems for use in Arabic in Yemen and then Morocco, in 2011; and the software system Tangerine®, created by RTI International beginning in 2010 and piloted in 2012. Tangerine® has been used in Zambia until recently. But, for the USAID Education Data Activity administered EGRA to Grade 2 learners in 2018, MSI’s Myna application has been employed. MSI developed Myna in 2016 to address some limitations with available applications and to provide for enhanced features required for MSI’s projects. Myna has been used by MSI in Jordan, Kenya, Lebanon, Morocco, and now in Zambia (more details are provided in later sections below).

5.1 CAUTIONS AND LIMITATIONS TO ELECTRONIC DATA COLLECTION

For electronic data collection, limitations to be aware of are:

- **RISK FOR ERROR** Electronic data collection is not foolproof. There is some degree of potential for input errors or loss of data.
- **COST CONSIDERATIONS** Cost analyses have indicated that efficiencies of using electronic data collection over paper instruments are most commonly achieved when the hardware is used for multiple data collections. Cost savings may not occur if the required hardware is used only for a single data collection.
- **NEED FOR PAPER BACKUPS** Assessment teams still must carry some backup paper instruments in case the electronic hardware should fail while they are conducting the fieldwork.

Therefore, paper instruments are introduced during assessor training along with the electronic software.

- **LIMITED EXPOSURE TO TECHNOLOGY** Planners must consider both the country/regional context and assessors' familiarity with technology when considering electronic data collection.
- **SECURITY ISSUES** Loss, theft, and damage to devices create the potential for financial loss or personal harm, so ensuring the safety and security of the hardware and assessors necessitates careful planning.
- **LIMITED COMMUNICATIONS INFRASTRUCTURE** Finding or creating remote, mobile hotspots for uploading field data can be difficult in some countries or regions.
- **LIMITED LOCAL CAPACITY** Adaptations of the instrument into local languages and scripts, and rendering the content into the chosen data collection software, present related challenges. Affiliations with experienced local partners are key in fully exploring and mitigating capacity limitations regarding e-data capture.

When using electronic data collection over paper data collection, researchers must also address the need to maintain the security of digital data; depending on the software used to collect the data, access to raw results may be accessible by multiple people. Even GPS points must be used only for verification purposes, and not to identify individual schools. As with paper-based research, every effort has to be taken to ensure that privacy is respected and that no individual schools, teachers, or students could be subjected to negative repercussions because of the results.

5.2 DATA COLLECTION SOFTWARE

Many mobile survey application tools exist that can be adapted for EGRA administration electronically. The open-source program Tangerine is a widely used application tool. As mentioned above MSI's Myna application has been adapted for the USAID Education Data Activity EGRA in 2018 in Zambia. Myna allows for tablet-based data collection and data management.

Myna is a MSI developed, custom Android application that was developed over several years by MSI to replace Tangerine due to several difficulties they have experienced using Tangerine for EGRAs. Myna is a custom-made application created specifically for the needs of the MSI Education Practice Area to conduct EGRAs and Early-Grade Math Assessments (EGMAs). Myna is a web-based application that has two defining

*Myna is a web-based application that has two unique features: (1) a **form builder** to design EGRA and SSME tools and (2) an easy-to-read **dashboard** for monitoring assessors' performance during training and data collection and tracking progress in data collection.*

features: 1) a form builder to design forms and 2) dashboards for monitoring enumerators during the training data collection. The form builder allows the construction of all the EGRA instruments and survey questionnaires. These forms are then published and pushed out to the tablets for use in the field. In addition, the form builder allows for instruments with extensive logic options that can be applied to each question including validations and skip-logic. Also, it allows customized grid-like questions to be included. The dashboards calculate assessors' inter-rater reliability (IRR) in real-time allowing the trainers to provide instant individualized feedback to assessors. Also, staff who remotely monitor the data collection can check the quality of the assessors' work during data collection. This feature is a key distinction from Tangerine, which requires users to download and analyze IRR data in a separate software program.

Myna can also run on lightweight and older tablets/versions of Android. It is designed to work in places with low or sporadic internet access, therefore, it can function without an internet connection. When the

application connects to the Internet, it automatically syncs the data on the tablet to the server. The records are then available on the dashboard and downloadable from the server.

Myna is an open source application and was developed with partial funding from USAID. MSI will make it available in early 2019 for wider use. MSI will publish the code for using the application, as well as instructions for standing-up the application and connecting it to servers so that other USAID partners and organizations administering EGRAs and EGMAAs can use it. In addition, the Client Solutions Team at MSI anticipates providing some support to external users that want to use Myna, including considerations for hardware selection and purchasing.

When procuring hardware to accommodate electronic EGRA data collection, implementers have to consider factors such as shipping, storage, and reuse of the materials. As of 2018, tablet computers (rather than mobile phones, smartphones, or laptops) were considered the most appropriate type of hardware because of their screen size, ease of use, light weight, and especially, long battery life. Tablet specifications for the 2018 baseline EGRA were as follows (Table 5):

TABLE 5: TABLET SPECIFICATIONS	
TECHNOLOGY	SPECIFICATION
Manufacturer	Samsung
Screen Size	8 inches
Operating System	Android 5.0 or higher (Lollipop)
Network	GSM
RAM	2gb
CPU	Dual Core 1.2 Ghz +
Internal Storage	8 GB +
External Storage	Additional MicroSD slot
Camera	3 MP +
GPS	A-GPS and GLONASS
Battery	8 hours + talk time
Security	Samsung Knox supported

At a minimum, additional accessories must include a stylus, protective case, and wireless router for effective data collection and ability to upload and send results daily to the server.

Implementers must also plan for appropriate storage of all hardware and accessories before and after data collection, and during training. All devices and peripherals are required to be stored in a location that can be secured to deter theft. The storage area also should be protected from dust, humidity, and extreme temperatures. Note that battery life of devices can be affected after long periods of nonuse.

5.3 SUPPLIES NEEDED FOR ELECTRONIC DATA COLLECTION AND TRAINING

- Tablets, each with charger (one for each person on the data collection team)
- Software containing electronic version of assessment
- Tablet cases
- Styluses
- Bags for assessors to carry tablets to the field sites
- Hotspot routers and connectivity dongles plus a data plan
- Several extra tablets in case of damage or loss
- Power banks

6 EGRA QCO AND ASSESSOR TRAINING

This section provides guidance on planning for and conducting training for EGRA Quality Control Officers (QCOs) and assessors. Note that this section is not intended to be an assessor or QCO manual; rather, it is a resource for the training organizers. The Guidance Notes for Planning and Implementing Early-Grade Reading Assessments contain additional details on assessor training and are recommended as a companion to this document (RTI International & International Rescue Committee, 2011)¹⁵.

The QCOs who will be piloting the instrument and supervising assessors will need a training of at least four working days. Assessors will also need a separate training of at least four working days along with two additional days to practice administering the EGRA to learners in schools. Ultimately, the length of training will depend on factors such as the number of instruments to be administered, the number of trainers available, the number of people to be trained, trainees' prior experience, and the budget and time available. For example, if some trainees will have limited proficiency in the language of the training, it is wise to add two or three days to the schedule.

To ensure that all QCOs and assessors understand the purpose of and endorse the work, a key element of both agendas is reviewing the underlying EGRA principles, the reasoning behind the instrument components, the training manual, as well as roles and responsibilities for planning for EGRA administration including who does what and when. Beyond that, the goals of the two trainings are similar and interrelated and only diverge in a few aspects.

QCO TRAINING GOALS

- Understand in detail the processes and procedures in the Test Administration Manual
- Demonstrate an ability to follow perfectly the instructions in the EGRA assessor protocols
- Exhibit facility in using the tablets and marking all of the EGRA subtasks using a suitable application software (E.g. Tangerine, Myna)
- Practice administration of IRR, student sampling in schools, the EGRA with students in schools, teacher questionnaire, head teacher questionnaire, and school inventory
- Show an ability to administer the QCO quality assurance checklist
- Demonstrate an ability to provide technical and logistical leadership and support to assessors

ASSESSOR TRAINING GOALS

- Understand in detail the processes and procedures in the Test Administration Manual
- Demonstrate an ability to follow perfectly the instructions in the EGRA assessor protocols
- Exhibit facility in using the tablets and marking the EGRA using a suitable application software (E.g. Tangerine, Myna) for all subtasks
- Practice administration of Inter-Rater Reliability tests (IRR), student sampling in schools, practicing administering EGRA with other assessors, and eventually using EGRA to assess learners in schools

¹⁵ See: <https://www.globalreadingnetwork.net/eddata/guidance-notes-planning-and-implementing-egra>. Also, see Early Grade Reading Assessment (EGRA) Toolkit: Second Edition, <https://www.globalreadingnetwork.net/resources/early-grade-reading-assessment-egra-toolkit-second-edition>

6.1 RECRUITMENT OF QCOS AND ASSESSORS

Generally, a team made of one QCO and two assessors are preferred to administer up to 20 EGRAs, both head teacher and class teacher interviews, as well as one school inventory checklist. Each team could complete a school per day under normal circumstances. Thus, based on sample size and time allocated to gather data, the number of assessors and QCOs required to complete an EGRA can be calculated for the sampling plan and used for recruitment. It is vital to recruit and train 10 to 20 percent more assessors than the sampling plan indicates. Inevitably, some will not meet the assessor quality criteria, and others may drop out after the training for personal or other reasons.

Data collection teams may be composed of education officials and/or independent assessors recruited for the particular data collection. Required and preferred qualifications are determined prior to recruitment and used during the recruitment phase, in advance of the training.

Government officials can be considered as candidates for the assessor or supervisor roles. In order to be selected for the fieldwork, however, they will need to meet the requirements and obtain permission from the employer to participate in training and data collection for EGRA. A potential benefit of involving qualified government officials is the greater likelihood of the government's positive reception to the EGRA findings, and ability to use the findings for decision making.

Important criteria for planners to consider when identifying candidates to attend the assessor training are the following:

- Ability to fluently read and speak the languages required for training and EGRA administration;
- Previous experience administering assessments or serving as a data collector;
- Experience working with primary school age children;
- Availability during the data collection phase and ability to work in target areas;
- Experience and proficiency using a computer or hand-held electronic device (tablet, smartphone).

The trainers and training facilitators will select the final roster of assessors and QCOs based on the following criteria. These prerequisites are communicated to trainees at the beginning so they understand that final selection will be based on who is best suited for the job.

- **ABILITY TO ACCURATELY AND EFFICIENTLY ADMINISTER EGRA** All those selected to serve as assessors must demonstrate a high degree of skill in administering EGRA. This includes knowledge of administration rules and procedures, ability to accurately record pupils' responses, and ability to use all required materials— such as a tablet—to administer the assessment. Assessors must be able to manage multiple tasks at once, including listening to the student, scoring the results, and operating a tablet.
- **ABILITY TO ESTABLISH A POSITIVE RAPPORT WITH LEARNERS** It is important that assessors be able to interact in a nonthreatening manner with young children. Establishing a positive, warm rapport with students helps them to perform to the best of their abilities. While this aspect of test administration can be learned, not all assessors will master it.
- **ABILITY TO WORK WELL AS A TEAM IN A SCHOOL ENVIRONMENT** Assessors do not work alone, but rather as part of a team. As such, they need to demonstrate an ability to work well with others to accomplish all the tasks during a school visit. Moreover, they need to show they can work well in a school environment, which requires following certain protocols, respecting school personnel and property, and interacting appropriately with students.

- **AVAILABILITY AND ADAPTABILITY** As stated above, assessors must be available throughout the data collection, and demonstrate their ability to function in the designated field sites. For example, they may have to work in rural areas where transportation is challenging, and accommodations are minimal.
- **COMMITMENT** QCOs and Assessors are required to sign consultant agreement, letter of commitment, child protection policy and criminal record and child abuse statement

In addition, facilitators should identify QCOs to support and coordinate the assessors during data collection. QCOs (who may also be known as data collection coordinators, or other similar title) must meet if not exceed all the criteria for assessors. Further, they must:

- Exhibit leadership skills, have experience effectively leading a team, and garner the respect of colleagues.
- Be organized and detail-oriented.
- Know EGRA administration procedures well enough to supervise others and check for mistakes in data collection.
- Possess sufficient knowledge/skills of tablet devices in order to help others.
- Interact in an appropriate manner with school officials and children.

The facilitators must also communicate these qualifications in advance to trainees and any in-country data collection partners. QCOs will not necessarily be people with high-level positions in the government, or those with another form of seniority. Officials who do not meet the criteria for assessors or QCOs could serve in another supervisory role, such as monitors who conduct drop-in site visits. These visits would consist of observing and supervising the data collection, and these officials are not required to attend the assessor training. The benefits of including the monitors could lead to greater understanding of the EGRA process and utilization of the results.

6.2 PLANNING THE TRAINING EVENT

Key tasks that need to take place before the training event include:

- **PREPARE EGRA INSTRUMENT AND TRAINING MATERIALS** Finalize the content of the instruments that will be used during training—both electronic and paper, for all languages. Other training documents and handouts (e.g., agenda, paper copies of questionnaires and stimulus sheets, supervisor manual) also need to be prepared and copies made.
- **PROCURE EQUIPMENT** Materials and equipment that the planners anticipate and procure well in advance range from the tablets and cases, to flipchart paper, stopwatches, power banks, and pupil gifts. Create an inventory to keep track of all materials throughout the EGRA training and data collection.
- **PREPARE EQUIPMENT** For those supporting the technology aspects of the training, once the tablets have been procured, they must be prepared for data collection. This means loading the software and electronic versions of the instruments onto the tablets and setting them up appropriately.
- **PREPARE WORKSHOP AGENDA** Create a draft agenda and circulate it among the team implementing the workshop. For an EGRA-only training, the main content areas in the agenda will include:
 - Overview of EGRA instrument (purpose and skills measured)
 - Administration of EGRA subtasks (protocols and processes; repeated practice)
 - Tablet use (functionality, saving and uploading of assessments)

- Sampling and fieldwork protocols.

See Annex C: Sample QCO and Assessor Training Agenda for a sample agenda for separate QCO and assessor trainings.

- **FINALIZE THE FACILITATION TEAM** Trainings are facilitated by at least two master trainers who are knowledgeable about EGRA and who have experience training data collectors. The trainers do not necessarily need to speak the language being tested in the EGRA instrument if they are supported by a local-language expert who can verify correct pronunciation of letters and words, and assist with any translation that may be needed to facilitate the training. However, the trainers must be fluent in the language in which the workshop will primarily be conducted. If the training will be led in multiple languages, a skilled team of trainers is preferred, and additional trainers can be considered.

6.3 COMPONENTS OF QCO AND ASSESSOR TRAININGS

As indicated in the sample agendas in Annex C: Sample QCO and Assessor Training Agendas, the QCO and assessor trainings will incorporate several similar and interrelated components.

QCO TRAINING COMPONENTS

- Review the Test Administration Manual in detail with specific focus on the structure of assessment teams, expectations of behavior, key daily activities, how to introduce the project to principals and teachers, the different subtasks on the EGRA, the purpose of an extra assessor and IRR, how to administer the assessment in an objective, technically correct, and friendly manner, and how to properly sample students from a school.
- Examination of EGRA assessor protocol instructions with emphasis on always adhering to the instructions as written. For QCOs it implies they must ensure assessors know the tools and instructions and follow the instructions properly. Therefore, they must spend a significant amount of time reading and practicing the instructions for the introduction, consent, and each subtask.
- Read out loud and practice the teacher questionnaire and head teacher questionnaire
- Practice using the tablet and Myna application including how to fill out enumerator details, how to access and read instructions, and marking the student responses on each EGRA subtask.
- Review QCO quality assurance procedures including how to observe assessors and help improve their performance by implementing a quality assurance checklist linked to each EGRA subtask.
- Explain the purpose of conducting IRR, how to implement IRR during the EGRA, view Gold Standard video, practice marking for IRR, and review the IRR results for an assessor to understand them.
- Practice student sampling scenarios and using the student sampling method with the My Random application on the tablet.
- Practice administering the EGRA and IRR with students at schools; provide individualized feedback to QCOs about how they administered the EGRA and IRR.
- Review the processes for completing data reporting sheets, provide explanation for missing daily assessment targets, show how to upload data daily from the tablets to the cloud, and to view the Monitoring dashboard on Myna.
- Review assessor training plan and logistics for practical assessments of students

ASSESSOR TRAINING COMPONENTS

- Review the Test Administration Manual in detail with specific focus on the structure of assessment teams, expectations of behavior, key daily activities, how to introduce the project to principals and teachers, the different subtasks on the EGRA, the purpose of an extra assessor and IRR, how to administer the assessment in an objective, technically correct, and friendly manner, and how to properly sample students from a school.
- Examination of EGRA assessor protocol instructions with emphasis on always adhering to the instructions as written. For QCOs it implies they must ensure assessors know the tools and instructions and follow the instructions properly. Therefore, they must spend a significant amount of time reading and practicing the instructions for the introduction, consent, and each subtask.
- Practice using the tablet and Myna application including how to fill out enumerator details, how to access and read instructions, and how to mark the student responses on each EGRA subtask.
- Explain the purpose of conducting IRR, how to implement IRR during the EGRA, view Gold Standard video, practice marking for IRR, and review the IRR results for an assessor to understand them.
- Practice student sampling scenarios and using the student sampling method with the My Random application on the tablet.
- Practice administering the EGRA and IRR with students at schools; provide individualized feedback to QCOs about how they administered the EGRA and IRR.
- Review the processes for completing data reporting sheets, provide explanation for missing daily assessment targets, show how to upload data daily from the tablets to the cloud, and to view the Monitoring dashboard on Myna.
- Review assessor training plan and logistics for practical assessments of students

6.4 TRAINING METHODS AND ACTIVITIES

Research on adult learning points to some best practices that should be employed in training. Whether the training involves a team of 20 people or 100, creating interactive sessions in which participants work with each other, the technology, and instrument will result in more effective learning.

Experience training EGRA QCOs and assessors globally indicates that the more opportunities participants have to practice EGRA administration, the better they learn to effectively administer the instrument. In addition, varying activities from day to day will allow participants the opportunity for deeper engagement and better outcomes. For example, daily activities on the tablet can include:

- Facilitator demonstrations
- Videos
- Whole-group practice
- Small-group practice
- Pairs practice
- Trainee demonstrations

Throughout the training, facilitators should vary the pairs and small groups. This may include pairing a more skilled or experienced assessor with someone less experienced.

Some ideas include a round-robin approach to practicing items that need the most review (e.g., participants sit in a circle and take turns quickly saying the sounds of the letters in the EGRA instrument); or simulations in which a person playing the role of an assessor makes mistakes or does not follow proper

procedures, then participants are asked to discuss what happened and what the assessor should have done differently. If more than one language will be involved, it is advised to keep these activities within the language groups. The facilitators will need to direct the trainees to also spend time practicing tablet functionality: drop-down menus, unique input features, etc.

Showing workshop participants videos of the EGRA being administered can help them to understand the process and protocols before they have an opportunity to administer it themselves. These videos—which will require appropriate permissions and will need to be recorded in advance of the training—can be used to model best practices and frequently encountered scenarios. They can serve as a useful springboard for discussions and practice.

6.5 SCHOOL VISITS

Assessor training always involves school visits to allow assessors to practice administering the EGRA to children and using the tablet and application similar to those they will encounter during actual data collection. The school visits also allow them to practice learner sampling procedures and to complete all required documentation about the school visit.

To help ensure productive school visits, the training leadership team must:

- Schedule school visits during the QCO and assessor trainings and ensure time is allotted for trainers to debrief with assessors after each school visit
- Identify how many schools are needed:
 - Base the number of schools on the number of trainees, size of nearby schools, number of visits.
 - Avoid overwhelming schools by bringing too many people to one school. Assign no more than 35–40 people to a large school but fewer for smaller schools.
- Identify schools in advance of the training:
 - Get required permission, alert principals, and plan for transportation; verify schools are not part of the full data collection sample. If this is not possible, make sure to exclude the practice schools from the final sample.
- Prepare teams a day in advance so they know what to expect:
 - Departure logistics, who's going where, team supervisors, number of students per assessor, assessments to be conducted, etc.

The trainers have the following duties during school practice visits.

- Help teams with introductions as needed
- Observe QCOs and assessors; provide assistance as needed
- With appropriate permission: Take photos or videos of the assessors, for further training and discussion during debrief
- Return classrooms/resources to the way they were when the teams arrived
- Thank the principal for time and participation

A quiet and separate space at the school will be needed for participants to practice administering the assessments. As seen in the picture, ideally, assessors should be able to sit across a desk from a child and



Source: USAID Education Data Activity, 2018. Photographed with consent from the subjects.

administer the instrument. If desks are not available, the child can sit in a chair that is placed at a slight diagonal from the assessor.

During the first school visit, it is helpful for participants to conduct the EGRA in pairs, so that they can observe and provide feedback to each other. Working in pairs is also helpful since participants are often nervous the first time, they conduct an EGRA with a child.

During a second or third visit, participants may be more comfortable working on their own and will benefit from practicing EGRA administration with as many children as possible during the visit. They will also be able to practice pupil sampling procedures and other aspects of the data collection they may not yet have learned about before the first school visit.

Each assessor will administer the instrument(s) to between four and eight¹⁶ children, each, at every school visit.

It is critically important after the visit to carry out a debriefing with the participants. It gives assessors an opportunity to share with the group what they felt went well, and what they found challenging. Often the school visit raises new issues and provides an opportunity to answer questions that may have come up during the training.

6.6 ASSESSOR EVALUATION PROCESS

A transparent evaluation process and clear criteria for evaluation are helpful for both facilitators and assessors. The process used to evaluate assessors during training includes both formal and informal methods of evaluation. As part of the informal evaluation, facilitators observe assessors carefully during the workshop and school visits and also conduct one-on-one interviews with them, when possible.

Assessors require feedback on both their strengths and challenges throughout the workshop. Having a qualified and adequate team of trainers will ensure that feedback is regular and specific. Likewise, having enough trainers will allow for feedback that addresses trainees' need for additional assistance, and for the careful selection of supervisors.

Careful observation of the assessors supports the collection of high-quality data—the ultimate goal. Therefore, whenever the assessors are practicing with QCOs, facilitators are walking around monitoring and taking note of any issues that need to be addressed with the whole group.

Evaluation of assessors is multifaceted and takes into consideration several factors, among them the ability to:

- Correctly and efficiently administer instruments, including knowing and following all administration rules

¹⁶ The number of pupils each data collector is able to assess at a school depends heavily on the number of subtasks per instrument and the total number of instruments being administered.

- Accurately record demographic data and responses
- Identify responses as correct and incorrect
- Correctly and efficiently use equipment, especially tablets
- Work well as a part of a team
- Adhere to school visit protocols
- Create a rapport with pupils and school personnel.

Throughout the training, assessors themselves reflect on and share their experiences using the instrument. The training leaders are prepared to improve and clarify the EGRA protocol (i.e., the embedded instructions) based on the experience of the assessors both in the workshop venue and during school visits.

Formal evaluation of assessors has become standard practice in many donor-funded projects and is an expected outcome of an assessor training program. The next section goes into detail about measuring assessors' accuracy. Trainers evaluate the degree of agreement among multiple raters (i.e., assessors) administering the same test at the same time to the same student. This type of test or measurement of assessors' skills determines the trainees' ability to accurately administer the EGRA.

6.7 MEASURING ASSESSORS' ACCURACY

As part of the assessor selection process, workshop leaders measure assessors' accuracy during the training by evaluating the degree to which the assessors agree in their scoring of the same observation.

This type of evaluation is particularly helpful for improving the assessors' performance before they get to the field. It must also be used for selecting the best-performing assessors for the final assessor corps for the full data collection, as well as alternates and supervisors.

Measuring assessors' accuracy during training has three main steps.

1. **Assessing and selecting assessors.** Establish a benchmark. Assessors unable to achieve the benchmark are not selected for data collection. In EGRA training, the benchmark is set at 90% agreement with the correct evaluation of the child for the final training assessment.
2. **Determining priorities for training.** These formal assessments indicate subtasks and items that are challenging for the assessors, which also constitute important areas of improvement for the training to focus on.
3. **Reporting on the preparedness of the assessors.** An assessor training involves three formal evaluations of assessors to assess and monitor progress of accuracy.

There are two primary ways to generate data for calculating assessor accuracy:

1. If the training leaders were able to obtain appropriate permissions before the workshop and to make audio or video recordings of students participating in practice or pilot assessments, then in a group setting, the recordings can be played while all assessors score the assessment as they would during a real EGRA administration. A skilled EGRA assessor also scores the assessment and those results are used as the Gold Standard.
2. Adult trainers or assessors can play the student and assessor roles in large- group settings (or on video) and assessors all score the activity. The benefit of this latter scenario is that the adults

can deliberately and unambiguously make several errors on any given subtask (e.g., skipping or repeating words or lines, varying voice volume, pausing for extended lengths of time to elicit prompts, etc.). The script prepared beforehand, complete with the deliberate errors, becomes the Gold Standard.

Measuring assessors' accuracy is important as it helps a trainer identify assessors whose scoring results are lower than 90% accuracy from the Gold Standard and who may require additional practice or support. It can also be used to determine whether the entire group needs further review or retraining on some subtasks, or whether certain skills (such as early stops) need additional practice.

Using the Gold Standard, the Myna application automatically calculates inter-rate consistency, both assessor subtask score and item level agreement. The application also identifies the item-level discrepancies between an assessor's mark and the Gold Standard. The results are vital for providing individualized feedback to assessors in order to correct misunderstandings about subtasks. If the analysis reveals consistent poor performance on the part of a given assessor, and if performance does not improve following additional practice and support, that assessor cannot participate in the fieldwork. Refer to Annex D: Data Analysis and Statistical Guidance for Measuring Assessors' Accuracy for more information about assessor accuracy data.

7 FIELD DATA COLLECTION

7.1 CONDUCTING A PILOT EGRA

A pilot test is a small-scale preliminary study conducted prior to a full-scale survey. Pilot studies are used to conduct item-level assessments to evaluate each subtask as well as test the validity and reliability of the EGRA instrument and any accompanying questionnaires. Additionally, pilots can test logistics of implementing the study (cost, time, efficient procedures, and potential complications) and allow the personnel who will be implementing the full study to practice administration in an actual field setting.

In terms of evaluating the instruments that will be used during the data collection, the pilot test can ensure that the content included in the assessment is appropriate for the target population (e.g., culturally and age appropriate, clearly worded). It also is a chance to make sure there are no typographical errors, translation mistakes, or unclear instructions that need to be addressed.

A pilot test is used to:

- Ensure reliability and validity of the instrument through psychometric analysis.
- Obtain data on multiple forms of the instruments, for equating purposes.
- Review data collection procedures, such as the functionality of the tablets and e-instruments along with the procedures for uploading data from the field.
- Review the readiness of the materials.
- Review logistical procedures, including transportation and communication, among assessor teams, field coordinators, and other staff.

Pilot testing logistics are as similar as possible to those anticipated for the full data collection, although not all subtasks may be tested and overall sampling considerations (such as regions, districts, schools, pupils per grade) will likely vary. If multiple versions of an instrument will be needed for baseline/endline studies, for example, preparing and piloting parallel forms at this stage helps determine and has the potential to lessen the need for equating the data after full collection.

Table 6 outlines the key differences between the pilot test and the full data collection.

TABLE 6: DIFFERENCES BETWEEN EGRA PILOT TEST AND FULL DATA COLLECTION

	PILOT TEST	FULL DATA COLLECTION
Purpose	To test the reliability, validity, and readiness of instrument(s) and give assessors additional practice	To complete full assessment of sampled schools and pupils
Timing	Takes place after adaptation	Considers the time of year in relation to academic calendar or seasonal considerations (holidays, weather); also factors in post-pilot adjustments and instrument revisions

Sample	Convenience sample based on target population for full data collection	Based on target population (grade, language, region, etc.)
Data	Analyzed to revise instrument(s) as needed	Backed up throughout the data collection process (e.g., uploaded to an external database) and analyzed after all data are collected
Instrument revisions	Can be made based on data analysis, with limited re-piloting after the changes	No revisions are made to the instrument during data collection

7.1.1 PILOT STUDY DATA AND SAMPLE REQUIREMENTS

The main purpose of the pilot is to ensure that the instruments are functioning properly as valid and reliable and selecting the best instruments for assessment using classical test theory. The pilot examines the psychometric properties of the instruments and items of the subtasks developed for each language at the adaptation workshop. The pilot data are not intended to measure student performance, so it is not necessary to obtain a representative sample. For the 2018 USAID Education Data Activity EGRA, the seven subtasks were piloted in two schools per language (14 schools total) with 45 pupils per school. Three pilot forms were developed for each language and fifteen students per school took each form. Each form had eight subtasks.

The students and schools selected for the pilot sample should be similar to the target population of the full study. However, to minimize the number of zero scores obtained within the pilot results, assessors may intentionally select higher-performing students, or the planners may specifically target and oversample from higher-performing schools. To see how the EGRA instrument functions when administered to a diverse group of students, pilot data obtained through convenience sampling should include pupils from low, medium, and higher-performing schools. Note that if school performance data are not available, it is advised to review socio-economic information for the specific geographic areas and use this information as a proxy for school performance levels. In general, it is not recommended that the convenience sample includes higher grades than the target population (e.g., fifth grade instead of second grade) as these students will have been exposed to different learning materials than target grade students and the range of non-zero scores may be quite different. However, in some contexts it is not possible to locate sufficient numbers of higher performing schools. In that case, it is permissible to go to higher grades in a pilot school as long as the target grade is also assessed.

Finally, the pilot sample, unlike the full study EGRA sample that generally targets the number of students per grade, can sample larger numbers of pupils per school. This type of oversampling at a given school allows for the collection of sample data more quickly and with a smaller number of assessors. Again, this is an acceptable practice because the resulting data are not used to extrapolate to overall performance levels in a country. While the 2018 USAID Education Data Activity EGRA did not use oversampling, but it is an option for future pilot tests of instruments.

7.1.2 ESTABLISHING TEST VALIDITY AND RELIABILITY

TEST RELIABILITY Reliability is defined as the overall consistency of measure. For example, this could pertain to the degree to which EGRA scores are consistent over time or across groups of students. An analogy from everyday life is a weighing scale. If a bag of rice is placed on a scale five times, and it reads

20 kg each time, then the scale produces reliable results. If, however, the scale gives a different number (e.g., 19, 20, 18, 22, 16) each time the bag is placed on it, then it is unreliable.

TEST VALIDITY Validity pertains to the correctness of measures and ultimately to the appropriateness of inferences or decisions based on the test results. Again, using the example of weighing scale, if a bag of rice that weighs 30 kg is placed on the scale five times and each time it reads 30, then the scale is producing results that not only are reliable, but also are valid. If the scale consistently reads 20 every time the 30-kg bag is placed on it, then it is producing results that are reliable (because they are consistent) but invalid.

The most widely used measure of test-score reliability is Cronbach's alpha, which is a measure of the internal consistency of a test (statistical packages such as SAS, SPSS, and STATA can readily compute this coefficient). If applied to individual items within the subtasks, however, Cronbach's alpha may not be the most appropriate measure of the reliability of those subtasks. This is because portions of the EGRA instrument are timed. Timed or time-limited measures for which students have to progress linearly over the items affect the computation of the alpha coefficient in a way that makes it an inflated estimate of test score reliability; however, the degree to which the scores are inflated is unknown. Therefore, Cronbach's alpha and similar measures are not used to assess the reliability of EGRA subtasks individually. For instance, it would be improper to calculate the Cronbach's alpha for, say, the non-word reading subtask in an EGRA by considering each non-word as an item. Calculating the overall alpha of an EGRA across all subtasks is necessary.¹⁷ For Cronbach's alpha or other measures of reliability, the higher the alpha coefficient or the simple correlation, the less susceptible the EGRA scores are to random daily changes in the condition of the test takers or of the testing environment. As such, a value of 0.7 or greater is seen as acceptable, although most EGRA applications tend to have alpha scores of 0.8 or higher.

For the untimed subtasks – listening comprehension, reading comprehension, and English listening comprehension – analysts calculated item level difficulty (i.e. percentage of correct responses by students), discrimination (i.e. item-total correlation), and number of observations (i.e. number of students who attempted the question). This means these three statistics were calculated for each individual question within each of these three subtasks on all forms in all languages.

Item difficulty is the proportion of students who answer that item correctly. The value of the statistic ranges between 0 and 1. For item difficulty the acceptable range was 0.2 to 0.9. Higher values indicate a greater proportion of students answered the item correctly (i.e., easy item) and lower values indicate a lower proportion of students responded to the item correctly (i.e., difficult item).

Item discrimination indicates how well the item can differentiate high performing students from low performing students. The value of item discrimination ranges between -1 and +1. The acceptable range is 0.2 and above. A negative value of an item indicates that more low-performing students answered that item correctly than high performing students (not desirable). A positive value of an item indicates that more high-performing students answered that item correctly than low performing students.

¹⁷ It should be noted that these measures are calculated on pilot data first, in order to ensure that the instrument is reliable prior to full administration; but they are recalculated on the operational (i.e., full survey) data to ensure that there is still high reliability.

For the timed subtasks – syllable fluency, non-word reading, and oral reading passage – analysts calculated the number of observations, mean score, percent correct, and standard deviation for the entire subtask. Thus, these statistics were computed for each subtask on all forms in all languages. The mean score and percent correct are two measures that indicate the difficulty of the subtask, while the standard deviation provides a sense of how far the scores are dispersed from the mean. In addition, analysts considered the number of items, broken into categories of 10 items each, attempted by students for these timed subtasks to understand how far students progressed in the subtask.

Another aspect of reliability is measuring the consistency among raters to agree with one another (known as interrater reliability, IRR). This measure of reliability assesses whether two assessors listening to the same child read are they likely to record the same responses correctly. Conducted during the full field data collection process, IRR involves having assessors administer a survey in pairs, with one assessor administering the assessment and one simply listening and scoring independently. Measuring the agreement between raters can be then be calculated by estimating Cohen’s kappa coefficient. This statistic, which takes a guessing parameter into account, is considered an improvement over percent agreement among raters, but both measures should be reported. While there is an on-going debate regarding meaningful cutoffs for Cohen’s kappa, information on benchmarks for assessor agreement and commonly cited scales for kappa statistics can be found in Annex D: Data Analysis and Statistical Guidance for Measuring Assessors’ Accuracy.

During the interval between the pilot test and the full data collection, statisticians and psychometricians analyze the data and propose any needed adjustments; language specialists and translators make corrections; electronic versions of the instruments are updated and reloaded onto all tablets; any hardware issues are resolved; and the assessors and supervisors are retrained on the changes.

7.2 FIELD DATA COLLECTION PROCEDURES FOR THE FULL STUDY

TRANSPORT The QCO of each team should have planned for obtaining reliable transport and arrive at the sampled schools before the start of the school day.

ASSESSMENT WORKLOAD Experience to date has shown that application of the EGRA requires about 30 minutes per child. During the full data collection, this means that a team of three assessors can complete about six instruments per hour, or about 18 children in three uninterrupted hours. The 2018 USAID Education Data Activity administered EGRA of Grade 2 learners is organized around three-person teams, with two assessors and one QCO. The QCO conducted between two and four assessments of students in each school as well as the administration of the teacher questionnaire, head teacher questionnaire, and school inventory protocol.

QUALITY CONTROL It is important to ensure the quality of instruments being used and the data being collected. Implementers must follow general research best practices:

- Ensure the safety and well-being of the children being tested, including obtaining children’s assent.
- Maintain the integrity of the instruments (i.e., avoid public release).

- Ensure that data are collected, managed, and reported responsibly (quality, confidentiality, and anonymity¹⁸).
- Rigorously follow the research design.

MATERIALS AND EQUIPMENT Properly equipping assessors and QCOs with supplies is another important aspect of both phases of the field data collection. For data collection, assessors and QCOs will need the following materials for each school visit:

- Copies of permission letters from MoGE headquarters and provincial education officials to give/show to provincial/District/school principal
- 1 tablet for each enumerator and the supervisor
- 1 copy of the student stimuli for each enumerator and QCO
- The Daily Team Testing Planner
- The Daily Tracker
- 1 sheet of paper for each enumerator
- 1 pen or pencil for each enumerator and QCO
- 1 pencil and 1 eraser for each kid tested to give as a gift
- 1 notebook for the QCO

SUPERVISION It is important to arrange for a QCO to accompany each team of assessors. QCOs provide important oversight for assessors and the collection process. QCOs are also able to manage relationships with the school staff; accompany students to and from the testing location; replenish assessors' supplies; communicate with the support team; and fill in as an assessor if needed.

LOGISTICS Pilot testing is useful for testing the logistical arrangements and support planned for the data collection process. However, the full data collection involves additional aspects of the study that are sorted out before assessors leave for fieldwork: verifying sample schools, identifying locations, and arranging travel/accommodations to the schools. An itinerary also is critical and will always include a list of dates, schools, head teachers' contact numbers, and names of team members. This list is developed by someone familiar with the area. Additionally, the study's statistician will establish the statistical sampling criteria and protocols for replacing schools, teachers, and/or students, and the training team communicates them well to the assessors. Finally, for the full data collection phase, the planners organize and arrange the delivery of the assessment materials and equipment such as backup copies of instruments, tablets, and school authorization letters.

Before departing for the schools, assessors and QCOs:

- Double-check all materials
- Discuss test administration procedures and strategies for making students feel at ease
- Verify that all administrators are comfortable using a stopwatch or their own watches in case tablets fail

Upon arrival at the school, the QCO introduces the team of assessors to the school principal. In most countries, a signed letter from the government will be required to conduct the exercise; the QCO orally

¹⁸ Anonymity: The reputation of EGRA and similar instruments relies on teacher consent/student assent and guarantee of anonymity. If data—even pilot data—were to be misused (e.g., schools were identified and penalized), this could undermine the entire approach to assessment for decision making in a given country or region.

explains the purpose and objectives of the assessment, and thanks the school principal for the school's participation in the EGRA. The QCO must emphasize to the principal that the purpose of this visit is not to evaluate the school, the principal, or the teachers; and that all information will remain anonymous.

The QCO must arrange with the principal and Grade 2 teachers for an available classroom, teacher room, or quiet place for each of the administrators to conduct the individual assessments. Assessors proceed to whatever space is indicated and set up two chairs or desks, one for the student and one for the assessor. It is also helpful to ask if there is someone at the school who can help throughout the day; this person also stays with the selected pupils in the space provided. The team will select only one class from Grade 2 following prescribed procedures. The team will work only with the local language teacher and students from that chosen class. The team will choose among sections with at least 20 students. The team will select the section whose teacher's first name is first in alphabetical order. The team should explain fully the activity to the teacher. To build rapport and trust, the enumerators should play a game with all the students in the class prior to doing the random selection.

During the first assessment each day, the QCO arranges for assessors to work in pairs to simultaneously administer the EGRA to the first student selected, with one actively administering and the other silently observing and marking. This dual assessment helps assure the quality of the data by measuring interrater reliability on an ongoing basis.

During the school day, the primary focus is the students involved in the study. Assessors will have been trained on building rapport, but often the pilot is the first time they will have worked with children. QCOs will be watching closely to make sure none of the children seem stressed or unhappy and that assessors are taking time to establish rapport before asking for the students' assent. Any key points from the observations of assessors working with the children are shared during the pilot debrief so that once teams go into the field, they are more adept at working with the pupils. Something as simple as making sure assessors silence their mobile phones makes a difference for students.

The QCO must remind assessors that if students do not provide their assent to be tested, they will be kindly dismissed, and a replacement selected using the established protocol.

If the principal does not designate a space for the activity, the assessment team will collaborate to locate a quiet space (appropriate for adult/child interaction) that will work for the assessment. The space should:

- Have sufficient light for reading and for the assessors to view the tablets
- Have desks arranged such that the students are not able to look out a window or door, or face other pupils
- Have desks that are clear of all papers and materials (assessors' materials are on a separate table or on a bench so they do not distract the child)
- Be out of range of the selected pupils; students who are waiting are not be able to hear or see the testing.

7.3 SELECTING STUDENTS

This section presents options for selecting learners once assessors reach a sampled school.

7.3.1 RANDOM NUMBER TABLE

If recent and accurate data on student enrollment by school, grade, and class are available at the central level before the assessment teams arrive at the schools, a random number table can be used to generate the student sample. Generating such a random number table can be statistically more accurate than interval sampling. As this situation is highly unlikely in most country contexts, interval sampling is more commonly used.

7.3.2 INTERVAL SAMPLING

This sampling method involves establishing a separate sample for each grade being assessed at a school. The idea is to identify a sampling interval to randomly select students, beginning with the number of students present on the day of the assessment. This method requires three distinct steps.

Step 1: Establish from the research design what group(s) will form the basis for sampling

It is important to note that Step 1 must be finalized well before the assessors arrive at a school. This determination is made during the initial planning phases of research and sample design. During the assessor training, the assessor candidates will be instructed to practice the sampling methodology based on the research design.

The purpose of Step 1 is to determine the role of teacher data, the grade(s) and/or class(es) required, and expectations for reporting results separately for boys and girls.

Step 2: Determine the number of students to be selected from each group: n

The second step consists of making calculations based on the total number of students to be sampled per school and the number of groups involved.¹⁹

ILLUSTRATION If the total number of students to be sampled is 20 per school and the students are to be selected from one grade (e.g. Grade 2) according to sex, then there are two groups and ten students ($20 \div 2$) that are to be selected from each group, as follows:

1. 10 male students from the selected class in grade 2
2. 10 female students from the selected class in grade 2

Step 3: Randomly select n students from each group

The purpose of this step is to select the specific children to be assessed. The recommended procedure is:

1. Have the children form straight lines outside the classroom according to sub-group
2. Count the number of children in the line: m .
3. Enter the number m into the My Random application, then indicate in the application to choose n (from Step 2) number of students.

¹⁹ See Annex B for more information on sample design

4. Ask the students with the numbers selected by the application to come forward and create a list with these students.

Once the assessors have administered the EGRA to all the students in the first group (as designated in Step 2), the assessment team repeats Step 3 to select the children from the second group. The QCO ensures the assessors always have a student to assess so as not to lose time during the administration.

CAVEATS When the chosen section has fewer than 20 students, work with all the students in the class. When the class has fewer than 10 girls or 10 boys, choose all the girls or boys who are available and select the remaining number of students from the girls/boys up to 20 students in all. For example, if there are seven girls in the classroom, choose all seven girls to take the test and choose 13 boys using the sampling method so that 20 students are taking the test.

7.4 END OF THE ASSESSMENT DAY

To the extent possible, all interviews at a single school are completed within the school day. A contingency plan must be put in place at the beginning of the day, however, and discussed in advance with assessors and supervisors as to the most appropriate practice given local conditions. If the school has only one shift and some assessments have not been completed before the end of the shift, the supervisor will find the remaining students and ask them to wait beyond the close of the school day. In this case, the school director or teachers make provisions to notify parents that some children will be late coming home.

7.5 UPDATING DATA COLLECTED IN THE FIELD

During data collection, regular data uploading, and review can help catch any errors before the end of data collection, saving projects from sending data collectors back into the field after weeks of data collection. Additionally, daily uploads can help prevent loss of large amounts of data if a tablet is lost, is stolen, or breaks. Data can be checked to ensure that the correct grade is being evaluated, that assessors are going to the sampled schools, and that the correct numbers of students are being assessed, as well as to verify any other inconsistencies. Constant communication and updates to let the project team know when data collection is proceeding, when the data analysts sees uploaded data, and if there are any delays or reasons that would prevent the uploading of data on a daily basis can help in reviewing the data as well as in knowing what results to expect and when.

Assuming data are collected electronically, the planners arrange the means for assessors to send data to a central server every day to avoid potential data loss (i.e., if a mobile device is lost or broken). If this is not possible, then backup procedures are in place. Procedures for ensuring data are properly uploaded or backed up will be the same during both pilot testing and full data collection. The pilot test is an important opportunity to make sure that these procedures function correctly.

Assessors will send their data to the central server using wireless Internet, either by connecting to a wireless network in a public place or Internet café, or by using mobile data (3G). When planning data collection, planners must consider factors such as available carrier network, compatibility between wireless routers and modems, and technical capacity of evaluators, and seek the most practical and reliable solutions.

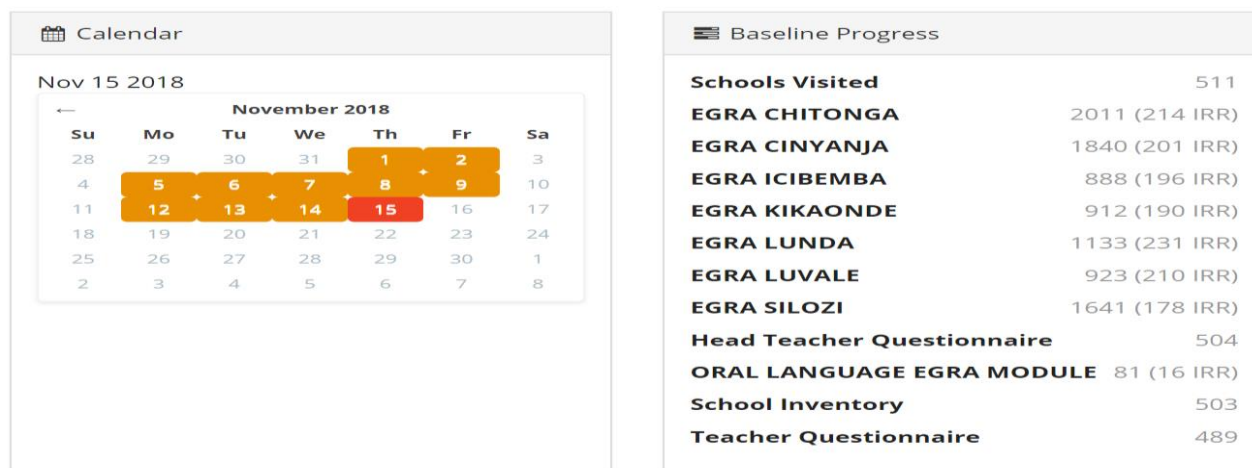
During the piloting, evaluators practice uploading and backing up data using the selected method. A data analyst verifies that the data are actually uploading to the server and then reviews the database for any technical errors (i.e., overlapping variable names) before the full data collection proceeds.

Backup procedures for electronic data collection include having paper versions of the instrument available for the data collectors' use. After every assessment completed in paper form, the supervisor reviews the paper form for legibility and completeness. The supervisor or designated individual is in charge of keeping the completed forms organized and safe from loss or damage, and ensuring access only by authorized individuals.

7.6 MONITORING DATA COLLECTION

After assessors sync the data on their tablets the data are stored on the cloud server. In order to view the synced data, the application must have a dashboard that features data from individual students and teachers as well as aggregations of the EGRA and questionnaire results. In addition, the dashboard should have IRR results for assessors. During 2018 USAID Education Data Activity administered EGRA to Grade 2 learners, a Myna web application which has features for a dashboard described above was used. Every day, the USAID Education Data Activity team checked the quality of the data collected. These daily checks are supplemented by in-person visits to schools during data collection by USAID Education Data Activity staff in Zambia.

FIGURE 12: MYNA DASHBOARD



- 1. EGRA AND QUESTIONNAIRE RESULTS** The Myna dashboard presents overall results for the number of schools surveyed, number of students assessed for the EGRA including IRR students, and number of students, teachers, or head teachers assessed for the different questionnaires (see Figure 12). The dashboard also has the functionality to view item-level responses from each questionnaire, meaning one can view the responses of an individual student on the EGRA at a specific school or the responses of a head teacher to his/her survey.
- 2. IRR RESULTS** The Myna dashboard provides the individual assessor subtask score for each administration of the EGRA with the functionality to view how an assessor scored the EGRA relative to the Gold Standard. For each day, there is also a graph that shows the distribution of assessors' subtask scores by categories.

- 3. IN-PERSON VISITS** Education Data activity staff with expertise in data collection procedures observed data collection at schools and provided real-time feedback on the completeness and quality of procedures demonstrated by QCOs and assessors.

8 PREPARATION OF EGRA DATA

This section covers the process of cleaning and preparing EGRA data. Once data are collected, recoding and formulas need to be applied to create summary and super- summary variables. Note that this section assumes that weights and adjustments to sampling errors from the survey design have been appropriately applied.

Nearly all EGRA surveys consist of some form of a stratified complex, multistage sample. Great care is required to properly monitor, check, edit, merge, and process the data for finalization and analysis. These processes must be conducted by no than more two statisticians. One person conducts these steps while the other person checks the work. Once the data are processed and finalized, then anyone with experience exploring complex samples and hierarchical data can familiarize themselves with the objectives of the research, the questionnaires/assessments, the sample methodology, and the data structure, and then easily analyze the data.

This section assumes the statistician(s) processing the data has extensive experience in manipulating complex samples and hierarchical data structures, and gives some specifics of EGRA data processing.

8.1 DATA CLEANING

Cleaning collected data is an important step before data analysis. To reiterate, data cleaning and monitoring must be conducted by a statistician experienced in this type of data processing.

Data quality monitoring is done as data are being collected. Using the data collection schedule and reports from the field team, the statistician can match the data that are uploaded to the expected numbers of assessments for each school, language, region, or other sampling unit. During this time, the statistician responsible for monitoring will be able to communicate with the personnel in the field to correct any mistakes that have been made during data entry, and to ensure the appropriate numbers of assessments are being carried out in the correct schools and on the assigned days. Triangulation of the identifying information is an important aspect of confirming a large enough sample size for the purposes of the study. Being able to quickly identify and correct any inconsistencies will aid data cleaning, but will also ensure that data collection does not have to be delayed or repeated because of minor errors.

Table 7 is a short checklist for statisticians to follow during the cleaning process, to ensure that all EGRA data are cleaned completely and uniformly for purposes of the data analysis.

TABLE 7: DATA CLEANING CHECKLIST**□ Review incomplete assessments.**

Incomplete assessments are checked to determine level of completeness and appropriateness to remain in the final data. Each project will have agreed criteria to make these decisions. For example, assessments that have not been fully completed could be kept if it is necessary for purposes of the sample size to use incomplete information; or the assessment being used can be verified as accurate and is not lacking any important identifying information.

□ Remove any test assessments that were completed before official data collection began.

Verify that all assessments included in the cleaned version of the data used for analysis are real and happened during official data collection.

□ Ensure that all assessments are linked with the appropriate school information for identification.

Remove any assessments that are not appropriately identified, or work with the field team to ensure that any unlabeled assessments are identified accurately and appropriately labeled.

□ Ensure child’s assent was both given and recorded for each observation.

Immediately remove any assessments that might have been performed without the assessor having asked for or recorded the child’s expressed assent to be assessed.

□ Calculate all timed and untimed subtask scores.

Score timed and untimed subtasks.

□ Ensure that all timed subtask scores fall within an acceptable and realistic range of scores.

During data collection, assessors may make mistakes, or data collection software malfunctions may lead to extreme outliers among the scores. Investigate any exceptionally high scores and verify that they are realistic for the pupil being assessed based on the child’s performance in other subtasks, and were not caused by some error. Remove any extreme observations that are determined to be errors in assessment, so as not to skew any data analysis. It is not necessary to remove all observations from that particular pupil, as this would affect the sample size for analysis in other subtasks. Simply remove any scoring from the particular subtask that is shown to be in error.

8.2 PROCESSING OF EGRA SUBTASKS

This section begins with the nomenclature for the common EGRA subtasks and variables, then discusses what information must be collected during the assessment and how to derive the rest of the needed variables from the raw variables collected. Note that Annex E of the toolkit is an example of a codebook for the variables in an EGRA data set.

Basically, the EGRA variable names have the structure: <prefix>_<core><suffix>

Example: e_letter_soundl

To maintain consistency within and across EGRA surveys, it is important to label subtask variables with the same names. Table 8 provides a list of variable names for EGRA subtasks as well as the names for variable timed scores (if the subtask is timed).

TABLE 8: EGRA SUBTASK VARIABLE NOMENCLATURE AND NAMES OF TIMED SCORE VARIABLES

NAME OF SUBTASK VARIABLE	SUBTASK	NAME OF SUBTASK TIME VARIABLE	LABEL FOR SUBTASK TIMED
syllable_sound	Syllable fluency	csspm	Correct Syllable Sounds per Minute

letter_sound	Letter sound identification	clspm	Correct Letter Sounds per Minute
invent_word	Non-word reading	cnonwpm	Correct Non-words per Minute
oral_read	Oral reading passage	orf	Oral Reading Fluency
read_comp	Reading comprehension	-	-
list_comp	Listening comprehension	-	-
oral_vocab	Oral vocabulary	-	-

8.2.1 PREFIX

If a student was assessed in more than one language, it is important to distinguish the languages with a prefix. Secondary languages need a prefix, such as an e_ for English or f_ for French.

8.2.2 SUFFIX

The EGRA subtasks will result in data being collected for each item a student got right, got wrong, or did not attempt because time ran out. That is to say, for the letter identification (sounds) subtask, the data will have a variable for each item tested.

From this information, it is possible to calculate all summary untimed score variables. The suffixes indicate the subtask item number and the score summary.

The suffix will be the item number in the subtask, or any additional variables associated with this subtask (such as: _auto_stop, _attempted, _time_remain). The suffix could be the item number found the subtask. For example, if there were five items in the English reading comprehension section, the variable names would be e1_read_comp1, e1_read_comp2, e1_read_comp3, e1_read_comp4, e1_read_comp5, e1_read_comp_attempted.

Please note, these item variable names do not have an underscore “_” between the core and the suffix number 1–5. So, variables would NOT be: e_read_comp_1, e_read_comp_2, e_read_comp_3, e_read_comp_4, e_read_comp_5. Non-item variables have an underscore “_” between the core and the suffix. Non-item EGRA variables are named e_read_comp_attempted and e_read_comp_score.

Table 9 contains some examples of how the EGRA variables are named, based on the language and the number of sections repeated within the instrument.

TABLE 9: SUFFIX NOMENCLATURE FOR THE ITEM AND SCORE VARIABLES

SUFFIX	VARIABLE SUFFIX LABEL	POSSIBLE VALUES
I-#	Item #	0 "Incorrect" 1 "Correct" . <missing> "Not asked/didn't attempt"

_score	Raw score	0 - # Items in Subtask
_attempted	Total items attempted	0 - # Items in Subtask
_score_pcnt	Percent correct	0-100
_score_zero	Zero score indicator	0 "Score>0" 1 "Score=0"
_attempted_pcnt	Percent correct or attempted	0-100

The following summary variables are then calculated:

- **_score.** Sum of the correct item responses (which are coded as 1).
- **_attempted.** Count of the correct and incorrect item responses, which are coded as either 1 or 0.
- **_score_pcnt.** Subtask_score divided by the number of possible items in subtask.
- **_score_zero.** Yes (recorded as 1) if the student scored zero; otherwise, No (coded as 0).
- **_attempted_pcnt.** _score divided by _attempted.

8.3 TIMED SUBTASKS

A timed subtask in the EGRA instrument is designed to be calculated on a per minute rate. Responses, such as individual letters or words, must be coded as either correct, incorrect, or no response/did not answer. The field assessor must distinguish between incorrect (coded as zero) and no response, as it will not be possible to analyze items attempted if there is no differentiation.

In addition to the item responses, the following summary variables must be included in the raw data for timed subtasks:

1. **Subtask_time_remain.** This is the time remaining in a subtask if a student finished the task before the allotted time expired. This summary variable will be used to calculate the per minute rate. It is recorded in seconds. Typically, a timed subtask will have a maximum of 60 seconds to be completed. Thus, time remaining will be 60 seconds minus the time taken to complete the subtask.
2. **Subtask_auto_stop.** In order to move efficiently through the assessment and not have students pause for a lengthy period trying to answer questions they clearly do not know; the assessment is stopped after a student is unable to answer the first few items—typically the first 10 (or fewer) items. A student who cannot respond before the auto-stop receives a code of 1 for that subtask, with 1 meaning yes the student was auto-stopped. This score is for the overall subtask and not recorded at the item level.

In order to create summary variables, individual item responses are set to 1 for correct answers, 0 for incorrect answers, and missing for no response/did not answer.

The per-minute rate is often referred to as a fluency rate. The timed subtasks are usually administered over a 60-second timed period, such that only those students who finish responding to the items in a subtask or reading the passage before the time ends will have fluency value different from their raw score. The final unit of measurement is either correct letters or correct words per minute.

The per minute rate is calculated using the following formula:

$$\text{subtask per minute} = \frac{\text{subtask score}}{\text{time given for subtask} - \text{subtask time remain}} \times 60$$

8.4 UNTIMED SUBTASKS

As with the timed subtasks, these item responses need to be coded as correct, incorrect, or no response/did not answer. In order to create summary variables, item responses are set to 1 for correct answers, 0 for incorrect answers, and missing for no response/did not answer.

Note about the reading comprehension activity:

As is standard practice, if reading comprehension is calculated from the same passage from which oral reading was assessed, students have been assessed on the number of reading comprehension questions they answered in the section of the passage they were able to read.

For example, if five reading comprehension questions were based on having read the passage through the 9th, 17th, 28th, 42nd, and 55th words, respectively, and a student read to the 33rd word, then that student will be assessed on the first three reading comprehension questions. The attempted responses are marked: correct, incorrect, or no response. The two final questions will be coded as not asked.

Although this benchmark may vary by context, in general, students are considered to be able to read fluently, with comprehension, if they read an entire passage and can answer 80% or more of the reading comprehension questions correctly. To calculate this, a new summary variable is created: `read_comp_score_pcmt80`, which is correct (coded to 1) if the reading comprehension score percent is 80% or higher; otherwise it is set to incorrect (coded as 0).

8.5 STATISTICAL EQUATING

Equating is a statistical procedure used to convert scores from multiple forms of a test to the same common measurement scale. This conversion process adjusts for any difficulty with differences between forms, so that a score on one form can be matched to its equivalent value on another form. As a result, equating makes it possible to estimate the score that a child being assessed with one form would have received had they been assessed with a different test form (Kolen & Brennan, 2004; Holland & Dorans, 2006).

Research on small-sample statistical equating (which is appropriate for nearly all EGRA equating) has shown that when true score differences between subtasks on two test forms are less than approximately 1/10 of a standard deviation, equating error can actually exceed the bias of not equating (Hanson, Zeng, & Colton, 1994; Skaggs, 2005). Therefore, equating is not recommended for small samples when the difference in scores across forms is no greater than 1/10 of a standard deviation.

When equating is necessary, there are a few important considerations to keep in mind.

The first point is that instrument developers must consider and recognize subtasks' suitability for equating. Four technical terms that underlie this discussion are common-item equating where two different groups of learners are taking different test forms that have a sample of items in common (anchor or equating

items); common-person equating where the same learners are taking all items from both of the two test forms; classical test theory (CTT) equating, and item response theory (IRT) equating.

COMMON-ITEM EQUATING It is used when instruments or subtasks are designed with some items that are common to all test forms. These common items (also known as anchor items) account for at least 20% to 25% of the total items on the assessment, and they represent a mini-version of the overall assessment (in terms of difficulty and variation). It is also important to ensure that anchor items retain their placement across test forms (e.g., if a particular anchor item is the fifth item on test form A, it is also the fifth item on test form B). The remaining items (i.e., non-anchor items) can be either reshuffled items from the original instrument or entirely new items.

The basic principle behind common-item equating is that the difficulty of anchor items is identical across assessment forms. Therefore, scores are adjusted to account for overall test difficulty based on the subscore for the anchor items. There are many methods for conducting common-item equating (including chained equating and post-stratification), but the breadth and depth of information needed to cover these topics are outside the scope of this toolkit.

Ultimately, common-item equating is best for subtasks that have sufficient items (a recommended minimum of 20–25 items), because of the reduced likelihood of statistical error (assuming a similarly small sample size).

COMMON-PERSONS EQUATING Also known as a single group design or randomly equivalent group design, this method is used when instruments or subtasks are designed to measure identical constructs but do not contain anchor items. This is currently the most common type of equating conducted for EGRA because it does not require knowledge of equating procedures at the instrument design stage. For this approach, multiple forms of the EGRA are piloted with a sample of students (each of whom take all forms). The basic principle is that differences in test scores across forms of the assessment can be seen as differences in test difficulty (as opposed to student ability), since the same students are taking each form. This approach is necessary for the oral reading fluency passage of EGRA since it is not possible to create anchor items for that subtask (and since item-level information is not relevant—which is a prerequisite for IRT equating, as discussed below).

In order to maximize efficiency and to take fullest advantage of the common-persons equating design, the following scenario should be used during the pilot stage where there is sufficient time (and foresight) to create a large number of parallel passages and sufficient funding to conduct a pilot with at least 500 students²⁰. In this scenario, it is suggested that EGRA developers create 10 reading comprehension passages with five questions on each (10 sets), using expert judgment in their construction to make them as parallel as possible on the front end. Each sample of students would then be administered three separate passages (and accompanying comprehension questions). The design could (hypothetically) look as shown in Table 10 (with 10 forms of 3 sets and 15 questions, each).

²⁰ This singular pilot could take the place of multiple pilots of 150–200 students (which is not uncommon in development work). It is simply a matter of cost-benefit and the value of having 10 evaluated passages.

TABLE 10: SAMPLE COUNTERBALANCED DESIGN

NUMBER OF STUDENTS	FIRST BLOCK	SECOND BLOCK	THIRD BLOCK	PILOT TEST FORM
50	1	2	4	A
50	2	3	5	B
50	3	4	6	C
50	4	5	7	D
50	5	6	8	E
50	6	7	9	F
50	7	8	10	G
50	8	9	1	H
50	9	10	2	I
50	10	1	3	J

In this design, every passage appears in each block (first, second, third), and each passage appears with six other passages. Passage order is rotated in order to minimize order effects. This approach requires a sample of 500 students (randomly assigned into 10 subsamples, with each receiving one of the 10 test forms). Therefore, it is possible to obtain robust measures of the relative difficulty of each item and set. Sets are then matched in order to obtain maximum comparability for pre- and post-testing, with confidence that changes in scores at the sample level would be meaningful.

CLASSICAL TEST THEORY (CTT) EQUATING Equating models based on CTT establish relationships between total scores on different test forms. This is a more “traditional” approach to test equating, and it is the most common approach for equating with small samples. CTT equating approaches include mean, linear, circle-arc, and equi-percentile equating. This toolkit does not provide in-depth explanations of each approach.

CTT equating is beneficial for linear data and for use with small samples. CTT equating is not recommended for subtasks with relatively few items (e.g., fewer than 10). For subtasks with 10–25 items, it may be possible to use a CTT pre-equating approach by piloting multiple, newly developed test forms along with baseline forms and comparing item-level statistics across forms. Ultimately, however, this approach is most useful for equating oral reading fluency.

ITEM RESPONSE THEORY (IRT) EQUATING IRT equating is based on the principle of establishing equating relationships through models that connect observable and latent variables. This approach has the advantage of using the same mathematical model characteristics of people and characteristics of instruments. IRT equating also has the advantage of being more compatible with the nature of testing while providing opportunities to equate subtasks with few items. However, IRT equating is procedurally and conceptually complex and requires significantly larger samples than CTT equating (with the exception of

the Rasch model, which requires the same sample size as CTT—which is approximately 100–150 participants).

Therefore, IRT equating is extremely useful for post-equating (i.e., equating on operational or full survey data—as compared with pre-equating, which is conducted using pilot data), when sufficient technical expertise and capacity are available. In the majority of EGRA work, IRT equating will ultimately be beneficial for pre-equating on subtasks that have few items as well as useful item-level data. Such subtasks include reading comprehension, listening comprehension, dictation, vocabulary, and maze.

9 DATA ANALYSIS AND REPORTING

This section of the toolkit provides a brief overview of the types of data analyses that correspond to various research designs, as well as required components to be included in EGRA reports.

When analyzing EGRA data, researchers must use descriptive and/or inferential statistics to describe the data, examine patterns, and draw conclusions. However, it is important to understand the differences between these two types of statistics, as well as the purpose and value of each.

9.1 DESCRIPTIVE STATISTICS

Descriptive (or non-inferential) statistics are used to describe and summarize data— often in an effort to see what patterns may emerge. Descriptive statistics do not allow for conclusions to be drawn beyond the data, nor is it possible to test research hypotheses. The main purpose for descriptive analysis is to present data in a meaningful way that allows for ease of interpretation (as opposed to simply presenting raw data). The most common measures reported in descriptive analyses are frequencies, measures of central tendency (e.g., means and medians) and measures of spread (e.g., standard deviations and summary ranges).

Also, as the name implies, descriptive statistics are used only to describe sample data. In much EGRA work, samples are selected to be representative of larger populations. In these cases, reported frequencies, means, etc., are based on weighted data and thus effectively become inferential statistics. Therefore, descriptive statistics are to be reported only for studies that are designed to draw no conclusions beyond samples; or as unweighted frequencies, unweighted means, etc., for complex survey data.

Lastly, with non-inferential statistics, it is essential that the sample be fully described according to the level of disaggregation to be analyzed and reported. For example, if pupil scores in the report are going to be disaggregated by language and grade, then the sample descriptive statistics include these levels of disaggregation.

Examples of useful descriptive statistics in EGRA reporting would be frequencies and means of basic demographic characteristics of the sample, as well as unweighted means across subtasks for all levels of disaggregation.

9.2 TYPES OF REGRESSION ANALYSIS

Given that regression is the most common way to analyze the relationships and predicted values of variables in EGRA data, it is important to briefly examine the different types of regression analyses that can be conducted. Ordinary least squares (OLS) regression analysis works well for EGRA data that have normally distributed residual values, when a continuous variable such as the oral reading fluency score is being used.

However, many developing countries have test scores that cluster around zero, making the distribution of scores very uneven. When dealing with such data, evaluators should consider using binomial regression analysis, such as probit or logistic regression, which allows evaluators to examine binomial outcomes such

as whether a student meets local benchmarks for reading ability or whether a student scores zero on a specific reading subtask.

9.3 REPORTING DATA ANALYSIS

The purpose of analyzing EGRA data is both to improve program effectiveness and to provide findings to clients, partner organizations, and government officials via briefs and full program reports. Recognizing that different objectives as well as audiences for reporting will shape the structure and the content of those reports, the following guiding principles are necessary:

1. **OBJECTIVES AND LIMITATIONS** The report must clearly state the objectives of the study and its limitations.
2. **PLAIN LANGUAGE** The main findings must be presented in clear, concise, and nontechnical language.
3. **DATA VISUALIZATION** Data visualization must be used to facilitate understanding of the findings by general audiences. Visualizations are “standalone,” such that the visual is interpretable without the audience needing to read extra text.
4. **DESCRIPTIVE AND INFERENTIAL ANALYSES** The main report presents summary findings of descriptive data analysis, including mean distributions and grouped distributions. Inferential statistical analyses are used to design weights, post-stratification weights, and the standard errors to account for the complex survey design (if appropriate).
5. **SCORE DISTRIBUTIONS** For every pupil score estimate reported, a visual of the score distribution must be graphically presented. This supports the reader’s interpretation of the estimate provided; for example, while the mean score can be produced, the accompanying distribution puts into perspective how “representative” the estimate is of pupil scores. This is especially important if the pupil scores are non-normal. In some cases, it may make sense to present median pupil scores in addition to the mean scores and distributions.
6. **LEVELS OF DISAGGREGATION** The results of data disaggregation by sex, grade, language, and other variables of interest must be described as appropriate to the research design.
7. **ALL RESULTS REPORTED** Whenever comparison-of-means statistical tests are conducted to compare across groups of subjects (such as sex or language), or bivariate/multivariate statistical analyses (e.g., correlations) are conducted to examine the relationship between different variables, results must be reported even if they are not statistically significant.
8. **SUBSTANTIATION FOR INFERENTIAL ESTIMATES** The following must accompany all reported inferential estimates (including but not limited to means, median, mode and proportions):
 - a. Precision – either as 95% confidence interval for estimates, or a t-score and p-value for comparisons in addition to standard errors.
 - b. Sample size
9. **EFFECT SIZES** Whenever results of comparisons of data across groups are presented (such as differences between baseline and endline, or between boys and girls, or between rural school students and urban school students), effect size of the difference must be reported.
10. **EQUIVALENCE** In experimental and quasi-experimental designs, equivalence of baselines must be established (What Works Clearinghouse, 2015).

10 USING RESULTS TO INFORM ACTION

10.1 SETTING COUNTRY-SPECIFIC BENCHMARKS

One of the virtues of EGRA is that the science behind it corresponds fairly well to the average layperson’s concept of what it means to read: the notion of “knowing one’s letters,” being able to read unhesitatingly and at a reasonable rate, and being able to answer a few questions about what one has read. Thus, being able to report that children cannot recognize letters, or can read them only extremely slowly, is something that most individuals can interpret. Relying on the data produced by EGRA or other types of individual, orally administered early grade assessments is a sound way to tell the story of whether schools are serving students in the most basic way.

Nonetheless, for focusing the attention of policy makers and officials on the question of how students are learning to read, it is useful to be able to benchmark the results in some way. Benchmarks are particularly useful for reading, as they establish expectations and norms for reading performance. Benchmarks are needed to gauge progress in any given country or context. A sound benchmark can be used to easily translate a set goal into measures of progress at specific points in time. For example, if the goal is that all children will learn to read well by the end of grade 3, a benchmark can show the percentage of pupils achieving different levels of reading ability in a given grade and year—indicating whether progress is being made toward that overarching goal. Additionally, benchmarks are found to be helpful when they are used as a means to communicate publicly about improvement (e.g., school report cards or national-level monitoring and reporting).

Standards allow for a common and measurable expectation to be applied across state or national populations, but allowing decentralized decision-making about how to get children to achieve those goals. The same objective measurements also serve as a mechanism for accountability, holding schools—and sometimes teachers—responsible for educational achievement. Studies show that high-stakes assessment systems do affect teacher and administrator behavior, but not in consistent or predictable ways. Therefore, care must be taken when benchmarks are being developed to ensure that the education system can use them to measure progress and identify areas where additional effort is needed, rather than using them to mete out high-stakes consequences.

10.1.1 WHAT ARE BENCHMARKS?

Benchmarks have been defined as “a standard or point of reference against which things may be compared or assessed” (Oxford online dictionaries, <http://www.oxforddictionaries.com>); “A criterion for performance at a particular point (a milestone),” and “empirically derived, criterion-referenced target scores that represent adequate reading progress” (Dynamic Measurement Group, Inc., 2010, p. 1).

For purposes of this toolkit, a “benchmark” is synonymous with a “standard” in that it defines a desired level of performance achievable at a particular point in time. Thus, a “benchmark assessment” is a diagnostic administered at regular intervals, used to evaluate whether students are progressing on track toward achieving desired standards. Benchmark scores may also be established at cut-points that help interpret the meaning of the specific score; for example, setting basic, intermediate, and proficient cut-points can help identify student profiles based on a definition of partial or total mastery.

Benchmarks may also be associated with targets (goals, objectives) that define expectations for the population; for example, if the benchmark determines how high to set the bar, the target defines how many children will clear that bar. For example: “60% of students meet the benchmark in Year 1; 80% of children meet the benchmark in Year 2.” Setting targets is particularly important where performance is low. The target defines an intermediate step toward achieving the goal.

In communication activities, messages are effective only if the desired audience can understand them. Providing EGRA results without a point of reference is usually ineffectual in environments where fluency measurements (i.e., 20 correct words per minute) are unfamiliar or assessments tend to be reported as a percentage of correct responses. A benchmark is a point of reference with which to interpret the performance because it provides an expected level of achievement. In the case of educational benchmarks, they add specificity to broad curricular goals such as “shall be able to read fluently” by stating instead, “shall be able to read at a rate of 40 correct words per minute by the end of grade 2.” However, those expectations need to be grounded in the country reality rather than adopted from other countries or languages. EGRA data can be used to define benchmarks, and subsequent administrations can generate data with which to evaluate performance over time according to those benchmarks.

Definitions

- Goal is a long-term aspiration, maybe without numerical value
 - Goal: All our children should read
- Metric is a valid, reliable unit of measurement
 - Metric: “correct words per minute in passage reading”
- Benchmark is a numerical step towards the goal, using the metric
 - Benchmark: 45 correct words per minute, understand 80% of what they read
- Target is a variable using the benchmark
 - Target: % of children at or above benchmark, or average achieved by the children, using the metric.

Source: LaTowsky (2014)

10.1.2 CRITERIA FOR ESTABLISHING BENCHMARKS

Setting benchmarks can employ a process that combines statistical analysis of student data over time with additional information such as research about the way children learn to read, experience elsewhere, insights from cognitive science and knowledge of local contexts. Benchmarks may change over time in line with improvements in student performance. There are many ways to develop standards or benchmarks, but the key criteria that good standards meet include:

- The benchmarks are ambitious, but realistic and achievable.
- They are not subject to score inflation (i.e., score increases do not generalize to other measures of the same content because they primarily reflect narrow test-preparation activities geared toward a specific test) (Hamilton, Stechter, & Yuan, 2008).
- Benchmarks must be able to identify students who are likely to fail at achieving an independent level of reading. Benchmarks are specific to a point in time (beginning of the year, end of the year, grade, etc.) and subsequent benchmarks are derived based on the probability that children meeting the first benchmark will also meet the next one (under current instructional conditions). (Dynamic Measurement Group, Inc., 2010)
- Benchmarks are based on research that examines the predictive validity of a score on a measure at a particular point in time, compared to later measures and external outcome assessments. If a

student achieves a benchmark goal, then the odds are in favor of that student achieving later reading outcomes if he/she receives research-based instruction from a core classroom curriculum (Dynamic Measurement Group, Inc., 2010).

- The best kinds of data to use are the test scores of real test takers whose performance has been meaningfully judged by qualified judges (Ziemy & Perie, 2006).
- Benchmarks are appropriately linked across the grades to avoid misclassification of students, or misleading reports to stakeholders. For example, while it may be appropriate to assign a higher cut-point to define an advanced student in grade 2 than defines a basic student in grade 3, the opposite is not true (Ziemy & Perie, 2006).

All benchmarks are ultimately based on norms, or judgments of what a child should be able to do (Ziemy & Perie, 2006). A country can set its own benchmarks by looking at performance in schools that are known to perform well, or that can be shown to perform well on an EGRA-type assessment, but do not possess any particular socioeconomic advantage or unsustainable level of resource use. Such schools will typically yield benchmarks that are reasonably demanding but that are demonstrably achievable even by children without great socioeconomic advantage or in schools without great resource advantages, as long as good instruction is taking place. The 2001 Progress in International Reading Literacy Study (PIRLS 2001), for example, selected four cutoff points on the combined reading literacy scale labeled international benchmarks. These benchmarks were selected to correspond to the score points at or above which the lower quarter, median, upper quarter, and top 10 percent of fourth-graders in the international PIRLS 2001 sample performed (Institute of Education Sciences, n.d.).

10.1.3 A PROCESS FOR SETTING BENCHMARKS

In Table 11, the general process that has been used in at least 12 low- income countries, including Zambia, for setting benchmarks and targets are shown.

TABLE 11: PROCESS TO SET BENCHMARKS

STEPS	PROCEDURE
Step 1: Determine benchmark for reading comprehension	Discuss level of reading comprehension that is acceptable as demonstrating full understanding of a given text. Most countries have settled on 80% or higher (4 or more correct responses out of 5 questions) as the desirable level of comprehension.
Step 2: Determine benchmark for oral reading fluency	Given a reading comprehension benchmark, use EGRA data to show the range of oral reading fluency (ORF) scores—measured in correct words per minute (cwpm) obtained by students able to achieve the desired level of comprehension. Determine the value within that range to put forward as the benchmark. Alternatively, a range can indicate the levels of skill development that are acceptable as proficient or meeting a grade- level standard (for example, 40 to 50 cwpm).
Step 3: Determine benchmark for decoding (non-word reading) skill	With an oral reading fluency benchmark defined, use EGRA data to examine the relationship between reading fluency and decoding (nonword reading) to identify the average rate of nonword reading that corresponds to the given level of reading fluency to set the benchmark for non-word reading.
Step 4: Set benchmarks for subsequent subtasks	Use the above process in the same manner as above for each subsequent subtask/ skill area.

As mentioned earlier, the Zambian Grade 2 National Assessment Survey conducted in 2014 was used to inform and draft national benchmarks and targets in July 2015. In the case of Zambia, during the

benchmarking workshop, participants faced contextual challenges that resulted in important decisions which, in turn, informed the steps and process described above. The participants and experts attending the benchmarking workshop decided to develop a single set of benchmarks for all the languages. While it is most commonly advised to develop a set of benchmarks and target for individual languages²¹, such an approach was judged not to be necessary in Zambia. The reason for this decision was that pupil performance across the languages in the Grade 2 NAS was more similar than not.

Table 12 below summarizes the benchmarks and targets that were set for reading and mathematics in Zambia during the July 2015 benchmarking workshop.

TABLE 12: NATIONAL BENCHMARKS AND TARGETS FOR READING IN ZAMBIA				
BENCHMARKS AND TARGET		NON-WORD READING	ORAL READING FLUENCY	READING COMPREHENSION
Benchmark		cwpm	cwpm	% correct
	Emergent readers	15	20	40%
	Readers	30	45	80%
Targets (percentages of pupils)				
Zero score	Baseline	68%	65%	80%
	5-year target	27%	26%	32%
Emergent reader	Baseline	12%	11%	7%
	5- year target	36%	33%	21%
Proficient reader	Baseline	2%	1%	2%
	5-year target	8%	4%	8%

Source: RTI International (2015b).

²¹ Developing a benchmark and target per language is often advised due to the differences in the orthographies and linguistic characteristics between any given languages.

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ANNEXES

ANNEX A: GUIDELINES FOR DEVELOPING ORAL READING PASSAGES AND READING COMPREHENSION QUESTIONS

CRITERIA FOR CREATING A SHORT STORY

1. Appropriate for children - content related to familiar events, their interests, and their curiosity and evokes positive emotions
2. Has the elements of a short story: a character, context, beginning, obstacle or problem, and a resolution
3. Gender balanced – feature both boys and girls
4. Avoids gender, religious or other stereotypes
5. Does not already exist or remind children of stories or legends they already know
6. Uses the present tense
7. Uses vocabulary that is appropriate to the region and age of the children to be tested
8. The first sentence should be very easy
9. Uses varied structure (syntax) but is not too literary/complicated
10. Allows for a variety of comprehension questions (literal and inferential)
11. Only uses one (common) proper name

COMPREHENSION QUESTIONS

1. Does not include questions which can be answered with “yes” or “no”
2. Does not include questions that ask the child to define vocabulary
3. Questions are concrete and refer to something concrete
4. Questions do not require a great deal of interpretation to understand

ANNEX B: RECOMMENDATIONS AND CONSIDERATIONS FOR CROSS-LANGUAGE COMPARISONS

RECOMMENDATIONS FOR THE NATURE OF WRITING SYSTEMS

To help make reasonable cross-linguistic comparisons, those adapting the EGRA tool must possess in-depth understanding of characteristics of the writing systems of the languages in question.

To improve the quality of cross-linguistic comparisons, one must know if the writing system of the language in question is morphosyllabic, syllabic, alphasyllabic, or alphabetic (Latin or non-Latin alphabetic).

The following guidelines are recommended in accordance with the type of language.

ROMAN-ALPHABETIC LANGUAGES

Within Roman-alphabetic languages:

1. Know if the orthographic depth of the language in question is shallow (transparent) or deep (opaque).
 - Research suggests that children who learn to read in shallow orthographies may learn to decode more quickly than those who learn to read in deep orthographies (Spencer & Hanley, 2003). Depth of the orthography is also related to how quickly and easily comprehension is attained (e.g. Share, 2008).
2. Know the syllable structure of the language in question.
 - Languages with complex syllables (e.g., consonant-vowel combinations such as ccvcc, as in “starts”) take longer to learn to read than languages in which simple syllables (e.g., cv, as in “mesa”) predominate.
3. Know that word length influences cross-linguistic comparisons.
 - Shorter words are recognized more quickly than longer words. For example, compare agglutinative languages, which connect several morphemes, with non-agglutinative languages.
4. Know that the written markings for tonal languages can influence comprehension, while this is unimportant for non-tonal languages.

RECOMMENDATIONS FOR ORAL LANGUAGE

Regardless of the desire to make cross-linguistic comparisons, all adaptations of EGRA must consider multiple aspects of oral language, such as: differences in dialects or the presence of diglossia, the clarity of directions, levels of difficulty of the contents of the phonological awareness, listening, and vocabulary subtasks.

For those focusing on cross-linguistic comparisons, it is particularly important to:

1. Ensure that oral reading passages in different languages have a similar level of difficulty.

2. Ensure that vocabulary words are measuring the same word meaning or construct in both languages.

RECOMMENDATIONS FOR PRINT AND ORTHOGRAPHIC KNOWLEDGE

The content for subtasks designed to measure print and orthographic knowledge can be controlled so that there is some comparability across languages.

Cross-linguistic comparisons would track the rate and accuracy with which students being tested in different languages recognized items appropriate for that grade level, as determined by their frequency in existing grade-level texts.

RECOMMENDATIONS FOR READING CONNECTED TEXT

Ensuring technical adequacy and basic comparability of connected-text reading passages in multiple-language administrations requires several considerations:

1. The passage is original writing prepared specifically for the assessment.
2. The passage addresses an age-appropriate topic in a familiar text structure, to minimize the influence of background knowledge on comprehension.
3. To best compare across languages, texts in both languages contain common story elements and topics familiar in both language groups.
4. The passage avoids the use of ambiguous words, such as:
 - A word that, spelled in one way, can represent more than one meaning (e.g., “wind” in English).
 - A word that can use more than one spelling to represent one meaning.

RECOMMENDATIONS FOR SECOND LANGUAGE/MULTILINGUAL LEARNERS

1. When comparisons are made between languages, ensure that they are made between the same “language classification.” For example, if a test is conducted among a group of English monolinguals or English first-language speakers, then comparisons are not made to English second-language (or later language) groups.
2. Simultaneous language acquisition (or learning two or more languages from birth or an early age) is possible, so a child may have two first languages.
3. There is potential for “transfer” of skills (that is, most decoding skills can be transferred among similar writing systems) when children are reading in an additional or nonnative language.
4. If a child is learning in a second (or later) language without adequate instruction in the first language, interpretation of results reflects this. It is likely to take children much longer to reach reading proficiency in these cases.

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ANNEX C: SAMPLE QCO AND ASSESSOR TRAINING AGENDAS

QCO TRAINING

Time	Day 1
08:30 - 09:00	Introduction of participants
09:00 - 09:30	Overview of USAID Education Data Activity and baseline
09:30 - 10:30	Baseline Test Administration Manual (Baseline instrument)
10:30 - 11:00	Tea break
11:00 - 11:30	Baseline Test Administration Manual (continued) (Test Administration Team) (till P7)
11:30 - 13:00	Understanding EGRA instructions
13:00 - 14:00	Lunch
14:00 - 15:00	Understanding EGRA instructions (continued)
15:00 - 16:30	Review and Practice all SSME Tools
16:30-17:00	Q&A and Conclusions

Time	Day 2
08:30 - 09:00	Review of previous day
09:00 - 10:30	Marking EGRA on tablets
10:30 - 11:00	Tea Break
11:00 - 12:00	Marking EGRA on tablets (continued)
12:00-13:00	Quality Assurance: using the observation checklist
13:00 - 14:00	Lunch
14:00 - 16:00	Implementing IRR during training
16:00 - 16:45	Practice sampling using TAM (Table 4 P.10)
16:45-17:00	Q&A and Conclusions

Time	Day 3
08:00 - 12:30	School Practice
12:30 - 13:30	Lunch
13:30 - 15:00	Leading daily feedback sessions
15:00 - 16:30	Daily data reporting and Uploading Data
16:30 – 17:00	Q&A and Conclusions

Time	Day 4
08:30 - 9:00	Review of previous day
9:00-10:30	Conduct second IRR
10:30 - 11:00	Tea break
11:00 - 12:00	Baseline Test Administration Manual (continued) (Test Administration Organization and procedure from P8 till the teacher Questionnaire P15.)
12:00-13:00	Review Enumerator Training Plan
13:00 - 14:00	Lunch
14:00 - 15:00	Review Enumerator Training Plan (continued)
15:00-16:30	Discussing logistics for training and field work
16:30 - 17:00	Q&A and Conclusions

ASSESSOR TRAINING

Time	Day 1
8:30	Arrival and check-in

9:00 - 9:30	Introduction of participants and overview of Education Data Activity project and EGRA baseline
9:30-10:30	Understanding EGRA instructions
10:30-11:00	Tea Break
11:00 - 13:00	Understanding EGRA instructions (continued)
13:00 - 14:00	Lunch
14:00-16:00	Introducing tablets and marking EGRA (plenary session)
16:00 - 16:30	Q&A and Conclusions

Time Day 2

8:30	Arrival and check-in
9:00- 9:30	Review of day 1
9:30-10:30	Marking EGRA (plenary session)
10:30 - 11:00	Tea Break
11:00-13:00	Marking EGRA (cont.)
13:00 - 14:00	Lunch
14:00 - 16:00	IRR Procedures and Practice 1 (different Language and gold standard in each room)
16:00 - 16:30	Q&A and Conclusions

Time Day 3

8:30	Arrival and check-in
09:00 - 09:30	Review of previous days
09:30 - 10:30	IRR Practice 2 (different Language and gold standard in each room)
10:30 - 11:00	Tea Break
11:00 - 13:00	Baseline Test Administration Manual
13:00 - 14:00	Lunch
14:00 - 15:30	Sampling
15:30 - 16:00	Practice sampling
16:00-16:30	Q&A and Conclusions

Time Day 4

8:30	Arrival and check-in
9:00 - 9:30	Review of previous days
9:30-10:30	Small Group practice (pairing per Language)
10:30-11:00	Tea Break

11:00-1:00	Small Group practice (pairing per Language)
13:00-14:00	Lunch
14:00-16:00	Final logistics for Dry Run days
16:00 - 16:30	Q&A and Conclusions
Time	Day 5
8:30	Arrival and check-in
9:00 – 12:00	Review logistics and sign paperwork
12:00	Depart for provinces
Time	Dry Run Day 1
08:00 - 13:00	Assessment teams in schools
13:00 - 14:00	Feedback sessions
Time	Dry Run Day 2
08:00 - 13:00	Assessment teams in schools
13:00 - 14:00	Team feedback sessions at central location in each province

ANNEX D: DATA ANALYSIS AND STATISTICAL GUIDANCE FOR MEASURING ASSESSORS' ACCURACY

This annex provides details about managing the data collected for gauging assessors' accuracy, including some related statistical terminology and guidance.

INTER-RATER CONSISTENCY

Percent agreement by assessor is then calculated by subtask. This measure is the agreement between the assessor's evaluation of the child and the correct evaluation of the child. To calculate each assessor's score for each subtask and for the assessment as a whole, MSI's Myna application calculates the number of agreements with the Gold Standard and expresses this a percentage of the number of items in the subtask/assessment.

The two calculations are the following:

$$\text{Assessor subtask score (\%)} = \frac{\text{Number of agreements with Gold Standard}}{\text{Number of items in the subtask}}$$

$$\text{Item level agreement (\%)} = \frac{\text{Number of agreements with Gold Standard for the item}}{\text{Number of responses (assessors) for the item}}$$

If the Gold Standard has missing items because the child did not complete all the items for a subtask, the agreement results by assessor also include agreement with the missing items.

For timed subtasks such as oral reading fluency and correct letter sounds per minute, if a child completes the subtask within the allotted time, it is important for the assessor to take an accurate reading of the time the child took to complete that task. If the assessor is within 2 seconds of the Gold Standard time remaining, the assessor is considered in agreement with the Gold Standard. Then an overall average percent agreement is calculated across all the time-remaining variables.

An overall percent agreement by assessor is an average of the subtask and time- remaining percent agreements. An overall assessment percent agreement is calculated as an average of the assessor overall percent.

Thus, the summary output is reported for each assessment and include the following:

- By assessor: Percent agreement by subtask and overall
- Overall percent agreement average
- Overall percent agreement by subtask.

STATISTICAL GLOSSARY AND DEFINITIONS

Raw percentage agreement: Measures the extent to which raters make exactly the same judgment

Kappa: Measures the extent to which two different ratings of the same subject could have happened by chance. Kappa values range from -1.0 to 1.0. Higher values indicate lower probability of chance agreement.

Intraclass correlation coefficient: Describes the consistency of scores given to students by different raters. ICC values range from 0.0 to 1.0. Higher values indicate greater agreement among assessors.

BENCHMARKS FOR ASSESSOR AGREEMENT

Raw percentage agreement: Due to the lack of detail that is generated solely by this statistic, no benchmark is possible. Efforts are made for assessors to have percentage agreement be as high as possible (as close to 100%) when assessing students. However, regardless of the percentage agreement, evaluators must reference the Kappa statistics to understand the quality of the percentage agreement statistic.

Kappa

TABLE 13: INTERPRETATION OF KAPPA STATISTIC (LANDIS & KOCH, 1977)

KAPPA STATISTIC	STRENGTH OF AGREEMENT
Less than 0.00	Poor
0.00 to 0.20	Slight
0.21 to 0.40	Fair

0.41 to 0.60	Moderate
0.61 to 0.80	Substantial
0.81 to 1.00	Almost perfect

TABLE 14: INTERPRETATION OF KAPPA STATISTIC (FLEISS, 1981)

KAPPA STATISTIC	STRENGTH OF AGREEMENT
Less than 0.40	Poor
0.40 to 0.75	Intermediate to Good
Greater than 0.75	Excellent

Intraclass Correlation coefficient

TABLE 15: INTERPRETATION OF INTRACLAS CORRELATION STATISTIC (FLEISS, 1981)

ICC STATISTIC	STRENGTH OF AGREEMENT
Less than 0.40	Poor
0.40 to 0.75	Intermediate to Good
Greater than 0.75	Excellent

REFERENCES FOR ANNEX D

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ANNEX E: SAMPLE CODEBOOK

TABLE 16: SAMPLE CODEBOOK WITH EGRA DEMOGRAPHIC VARIABLES

SECTION: DEMOGRAPHIC	FORMAT	LABEL NAME	LABEL VALUES	VARIABLE LABEL
country	string	-	(Largest Geographical Variable)	In which country was the Assessment given?

project	string			Which project within the country?
year	integer (2000-2020)	-	-	In what year was the student tested?
month	ordinal (1-12)	month	1 January 2 February . . . 12 December	In what month was the student tested?
date	date format	-	-	On what date was the student tested?
state	nominal	state	country specific list (Second largest geographical variable, below Country)	In which state is the student's school located?
region	nominal	region	country specific list (Third largest geographical variable, below State)	In which region is the student's school located?
district	nominal	district	country specific list (Smallest geographical variable, below Region)	In which district is the student's school located?
school	string	school	country specific list	What is the name of the student's school?
school_code	integer	-	country specific list	School's code within country.
emis	integer	-	-	Education Management and Information System code.
school_type	nominal	school_type	0 Public 1 Private 2 Religious_Mission 4 Community 5 Combined 6 Regular 7 Youth 8 Public_Islamiyya 9 Monrovia 10 Mont. Barclay 11 "Grant-Aided", replace	What type of school does the student attend?
curriculum	nominal	curriculum	1 Classique 2 Curriculum 3 Medersa 4 "World Bank" 5 "Ministry of Education" 6 ALP 7 NFE, replace	Sub category of school_type for curriculum type
treatment	dummy	treatment	0 "Control" 1 "Partial Treatment" 2 "Full Treatment", replace	What level of treatment is the school receiving?
treat_year	ordinal (0-12)	-	-	How many years has the school been receiving the treatment?
treat_phase	ordinal (1-6)	treat_phase	1 Baseline 2 MidtermA 3 MidtermB 4 MidtermC 5 MidtermD 6 Final	In which phase of the study is this treatment school student?
urban	dummy	urban	0 Rural 1 Urban	Is the school in an urban area?
shift	ordinal (0-2)	shift	0 "No Shift" (Full Day) 1 Morning 2 Afternoon 3 Alternating	Does the student attend in school in shifts?
dbl_shift	dummy	yes/no	0 No 1 Yes	Does the school operate on double shifts?
admin	nominal	admin	country specific list	Who administered the test? (Code Number)

admin_name	string	-	-	Who administered the test?
id	integer	-	Must be unique!!!!	Unique student ID number.
grade	integer (1-8)	grade	1 First 2 Second 3 Third 4 Fourth 5 Fifth 6 Sixth 7 Seventh 8 Eighth	What is the student's grade level?
level	integer	-	same as grade, but for students who are not traditional (ex. CESLY)	For non-traditionally aged students, what "grade" level are they learning at?
section	integer	-	country specific list	Which grade section is the student in?
female	dummy	female	0 Male 1 Female	Is the student female?
class_size	integer	-	-	How many students in the student's class?
multigrade	dummy	yes/no	0 No 1 Yes	Is the student's class a multiple-grade classroom?
teacher	integer	teacher	country specific list	What is the name of the student's teacher?
age	integer (5-18)	-	-	How old is the student?
start_time	time (h, m)	-	-	Test start time?
end_time	time (h, m)	-	-	Test end time?
assess_time	time (m)	-	-	Test length?
language	integer	language	see language sheet	Language the test was conducted in?
consent	dummy	yes/no	0 No 1 Yes	Did the child give consent to be tested?