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Early learning assessments: A retrospective

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Early learning assessments: A retrospective

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Background Paper for the 2015 UNESCO Global Monitoring Report

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Preface

In Jomtien in 1990 and again in Dakar in 2000, world leaders committed to the measurement and improvement of learning as part of Education for All. Yet clear, actionable metrics, particularly in the early grades and in the poorest countries, would continue to elude the sector. This paper reflects on the development and impact of the early grades reading and mathematics assessments, open-source tools applied in more than 60 countries and 100 languages. Case studies illustrate the promise and pitfalls of working at national scale, while summary results from 10 nationally representative studies document the scope of the crisis in early learning. The authors conclude with reflections and aspirations for placing country-driven learning assessment at the centre of post-2015 goals.

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Introduction

> Whether or not expanded educational opportunities will translate into meaningful development – for an individual or for society – depends ultimately on whether people actually learn as a result of those opportunities, i.e., whether they incorporate useful knowledge, reasoning ability, skills, and values. The focus of basic education must, therefore, be on actual learning acquisition and outcome, rather than exclusively upon enrolment. … It is, therefore, necessary to define acceptable levels of learning acquisition for educational programmes and to improve and apply systems of assessing learning achievement. (UNESCO, 1990)
>
> Improving all aspects of the quality of education and ensuring excellence of all so that recognized and measurable learning outcomes are achieved by all, especially in literacy, numeracy and essential life skills. (UNESCO, 2000)

As the above quotations show, at the World Conference on Education for All, Jomtien, Thailand, in 1990 and again at the World Education Forum, Dakar, Senegal, in 2000, world leaders voiced commitment to the measurement and improvement of learning as part of Education for All. Yet reasonably common, clear and actionable learning metrics, particularly in the early grades and in the poorest countries, would continue to elude the sector. The search for improved metrics on, and measurement of, learning, while not as central to donor efforts as the goal of getting all children enrolled in and completing primary education, did increase in the post-1990 period. In a review of World Bank projects from 1963 to 1993, less than 2 per cent of overall funds committed to education were for assessment activities; in an update of the review, for the 109 projects for which information was available, Liberman and Clarke (2012) found that the amount increased to 37 per cent from 1998 to 2009.

Both then and now, ministries struggle with how to conduct and use student assessment results to improve learning in their schools and classrooms. Effective assessment systems, simply

put, provide high-quality, actionable information to inform decision-making to improve learning. Yet many countries lack the minimum conditions, including adequate assessment tools, practices, knowledge and expertise, to develop and sustain effective assessment systems; the shortage and in some cases absence of these conditions is particularly acute in low-income countries. All components of an assessment system, including classroom assessments (to support teaching and learning in classrooms), examinations (for selection or certification) and large-scale, system-level assessments (both national and international for the purposes of monitoring and providing feedback on overall performance) should complement to one another to inform the improvement of learning outcomes (Clarke, 2012). Clarke's framework, replicated in Table 1, provides an illustration of both the technical and policy considerations that must be addressed for building a more effective assessment system – one that supports learning.

Table 1. Framework for building a more effective student assessment system

	Classroom assessment	Examination	Large-scale, system-level assessment
Enabling context	Policies Leadership and public engagement Funding Institutional arrangements Human resources		
System alignment	Learning/quality goals Curriculum Pre- and in-service teacher training opportunities		
Assessment quality	Ensuring quality (design, administration, analysis) Ensuring effective uses		

Source: Clarke, 2012, p. 13.

Throughout the 1990s and into the 2000s, few low-income countries had an assessment system that could inform learning improvement, particularly in the critical early grades. The development of the early grade reading and mathematics assessments (EGRA and EGMA), as this paper will show, helped low-income countries fill a gap between the annual high-stakes

national examinations and international large-scale assessments. In some cases conducting an early learning assessment helped to reinvigorate discussion on learning across the system, leading to large-scale reform and improvement. In other cases the assessment generated some controversy, but little discernible action for improvement. Yet there is little doubt that the growth in applications of EGRA and EGMA has surpassed expectations. Since EGRA's first pilot in 2007 through mid-2014, more than 60 countries, mostly in the global south, have conducted one or more early learning assessments using or drawing from the EGRA framework. With a focus on understanding foundation skills in the language of instruction, EGRA has also led to a renewed emphasis on mother-tongue instruction and assessment; there are now adaptations of EGRA in more than 100 languages.

This paper reflects on the development and impact of EGRA and EGMA in the context of the run-up to the post-2015 goal-setting process. Beginning with a brief summary of the context and history of learning assessments from 1990 to 2014, the paper then documents the development of EGRA and EGMA and their rapid expansion. Case studies illustrate the promise and pitfalls of working at national scale, while summary results from 10 nationally representative studies document the scope of the crisis in early learning. The authors conclude with reflections and aspirations for placing country-driven learning assessment at the centre of post-2015 goals.

The 1990s: Learning assessments in the context of Jomtien

In the run-up to and immediately following the World Conference in Jomtien, education experts warned that a focus on access and completion, without commensurate attention to learning, would lead to a 'collapse' in quality in many countries (Fuller & Heyneman, 1989). The debate on the trade-offs between access and quality would persist throughout the 1990s and beyond, as countries set on meeting the goals of Education for All (EFA) eliminated school fees and children by the millions flooded primary schools in Uganda, Kenya and elsewhere.

The roundtable discussion at the Jomtien conference, Using Assessment to Improve Learning, concluded that countries should include in the national EFA goals '[i]mprovement in learning achievement such that an agreed percentage of an appropriate age cohort (e.g. 80 per cent of 14-year-olds) attains or surpasses a defined level of necessary learning achievement' (World Conference on Education for All, 1990).

Following the conference, UNESCO and UNICEF jointly created the Monitoring Learning Achievement (MLA) project, the first cross-country assessment for low-income countries, to help governments measure and meet this target. Eventually 72 countries would participate in MLA I (Grade 4) and/or MLA II (Grade 8). The MLA relied on South-South exchange and encouraged supportive relationships among participating countries and national and regional research institutions. The core aims of the MLA project were to: establish indicators and methods to monitor quality, undertake periodic assessments to provide information to decision makers, establish common levels of learning outcomes, support long-term monitoring, build national capacity and strengthen information exchange (Chinapah, 1999). The report argued further that MLA was 'a strategy leading not only to a better understanding of the factors impeding and/or improving the quality of basic educational services, but also to the development

of feasible alternate strategies for improving the quality of basic education and for monitoring its effectiveness' (Chinapah, 1999).

By 1994 five countries had piloted MLA, and by the time of the 2000 Dakar forum, about 50 countries were at various stages of implementing such surveys. MLA turned out to be much more costly and time consuming than originally expected, however, and the results were discouraging rather than motivating. For example, none of the nine sub-Saharan African countries achieved the stated goal of 80 per cent of minimum levels of learning, per the EFA roundtable cited above. In some cases, results were so poor as to suggest that students were simply guessing the multiple-choice responses. Few countries pursued the MLA process after the Dakar meeting. The lack of clear funding mechanisms, multidonor support and political will may have contributed to the decline of MLA as the go-to learning assessment for low-income countries.

In parallel to the MLA work, efforts were under way to improve existing high-stakes national examinations, many of which were established under the former colonial systems as a way of screening for the elite ranks of the civil service. In most countries, national examinations are administered at the end of the primary cycle (sixth or eighth grade) and low pass rates are seen as a sign of system quality, limiting access to coveted secondary school places only to those who could pass the test. Some international education experts saw improvement in national examinations as an important strategy for improving the overall quality of education systems (Capper, 1994; Kellaghan & Greaney, 1992; Murphy, Greaney, Lockheed, & Rojas, 1996), yet as Chapman and Snyder (2000) documented, there was little evidence that assessment results, and in particular data from examinations, were being used to improve learning, particularly in low-income countries.

In this context, the rise of international large-scale assessments, including TIMSS (established in 1995), PIRLS (est. 2001) and PISA (est. 2000) helped to provide system-level information regarding the relative performance of children in Organisation for Economic Co-operation and Development (OECD) and a few low-income countries. In the 1990s, several regional assessments, including SACMEQ (est. 1995), PASEC (est. 1991) and LLECE (est. 1997)[1] rounded out the picture for a number of middle- and low-income countries (albeit restricted to sub-Saharan Africa and Latin America). But as others have noted (Wagner, 2011), the long wait between assessments (between three and five years for some, up to ten for others) makes the use of the assessments to address immediate system and classroom-level needs impractical.

Due to the elusiveness of a clear learning metric, of the six goals for Education for All established at the 2000 Forum in Dakar, only those relating to primary education enrolment and completion made their way into the Millennium Development Goals (MDGs). Although the drawbacks of these indicators were well known, they were among the few that provided enough data points for enough countries to make projections to 2015. One of the architects of the MDGs reported that 'feasibility' was a major consideration in the selection of all the goals. 'Those who state that the MDGs are aspirational fail to understand that they are based on [actual] global progress witnessed in the 1970s and 1980s…' (Vandemoortele, 2011). The search for a clear, actionable and feasible measurement of learning as an indicator of high-quality universal primary education would occupy the education community throughout the decade and beyond, as described in the next section.

[1] TIMSS–Trends in International Mathematics and Science Study; PIRLS–Progress in International Reading Literacy Study; PISA–Programme for International Student Assessment; SACMEQ–Southern and Eastern Africa Consortium for Monitoring Educational Quality; LLECE–Latin American Laboratory for Assessment of the Quality of Education. Information on commencement dates obtained from programme websites: http://timssandpirls.bc.edu/; http://www.oecd.org/pisa/aboutpisa/; http://www.sacmeq.org/origins; http://www.confemen.org/le-pasec/historique/;

Evolution of learning assessments post-Dakar, 2000–2014

Following the forum in Dakar, renewed interest in learning and a growing recognition of the effect of the expansion of universal primary education on all aspects of quality provoked a call for improved assessment of learning and perhaps the creation of a learning metric. World Bank economist Lant Pritchett's (2001) cross-national study arguing that the absence of a link between the growth rate of worker productivity and rising educational attainment was explained by low education quality helped to kick off a debate within the World Bank and other circles. Building on this analysis, he and colleagues later called for the creation of a 'Millennium Learning Goal' to monitor progress in education (Filmer, Hasan, & Pritchett, 2006). Around the same time, reviews of project portfolios at the World Bank (Nielsen, 2006), UNICEF (Chapman, 2002) and the US Agency for International Development ([USAID] (Chapman & Quijada, 2009) revealed that decades of investment had produced few documented learning gains.

Why was there so little evidence of impact on learning from the billions of dollars poured into education in developing countries the 1990s and early 2000s? Part of the answer was simply a data problem. While the suite of international large-scale assessments (ILSAs) developed and scaled throughout the 2000s contributed greatly to cross-country comparisons of learning, their coverage, particularly for assessments supported by the OECD and the International Association for the Evaluation of Education (IEA), was largely restricted to the global north (Crouch & Gove, 2011). Those few low-income countries that participated scored quite poorly; in several cases the proportion of students performing below the floor of the assessment, at levels that could be registered on the assessment scale, were so high that the overall reported results were

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http://www.unesco.org/new/es/santiago/education/education-assessment/

not considered reliable.[2] Additionally, the lengthy three- to four-year time cycles (required to ensure accuracy and consistency in the design of the assessment across multiple countries, languages and contexts) did not allow for the quick analysis and action needed in the face of what would come to be recognized as a learning crisis in many low-income countries. Lastly, these assessments were designed to capture the cumulative effects of the inputs of a learning system (testing students in fourth and eighth grades [PIRLS and TIMSS], or 15 year-olds [PISA]). For low-income countries, as many as half of enrolled students drop out before reaching secondary school; finding ways to assess and improve learning before students exit the system is critical. On the other end of the assessment spectrum, national assessments and examinations, largely overlooked in discussions of education quality, were increasing in quantity and quality but, despite calls for their increased support, would remain mostly marginalized by the global education community as a source of evidence for monitoring learning outcomes (Benavot & Tanner, 2007).

In this context, USAID commissioned the creation of an assessment it hoped would help low-income countries to rapidly diagnose and improve learning outcomes while simultaneously informing the global community (RTI International, 2007). Motivated by the 'floor effects' of the existing ILSAs and the low overall average performance of low-income countries on these tests, USAID proposed the development of a tool to assess the 'extent to which early grade primary school children … are learning to read with an acceptable degree of comprehension and at an acceptable rate of fluency' (RTI International, 2007). The development of the early grade reading assessment (EGRA), as described in detail elsewhere (Crouch & Gove, 2011; Gove & Wetterberg, 2011; RTI International, 2009b), began in 2006 with the convening of an expert

[2] For example, on the 2011 PIRLS, Morocco, Oman and South Africa all reported an excess of 16 per cent of students with results too low for estimation, raising reservations about the reliability of average achievement results. http://timssandpirls.bc.edu/pirls2011/downloads/P11_IR_AppendixD.pdf

workshop with World Bank and USAID support. There, RTI presented a draft assessment protocol of foundation skills in early reading, drawing from existing oral, individual assessments and studies implemented in the US and elsewhere (for a detailed list of referenced assessments, please see the EGRA Workshop Notes and the English, Spanish and French EGRA toolkits (RTI International, 2007, 2009b, 2009c, 2009d)).

The conceptual model followed in the English assessment is guided by the work of the US National Reading Panel (National Institute of Child Health and Human Development, 2000), the National Literacy Panel on Language-Minority Children and Youth (August and Shanahan 2006) and the Committee on the Prevention of Reading Difficulties in Young Children (Snow, Burns, & Griffin, 1998), among others. Each of the other toolkits draws on a similar frame of reference but varies in degrees; for example, the French toolkit includes literature surrounding the need for identification of graphemes particular to the French language, while the Spanish assessment signals that identification of Spanish letter sounds is important, but requires less instructional time compared to the time required by less transparent orthographies such as English and French. The main principles derived from the literature identified in all three toolkits are twofold. First, assessment of reading is complex, but we have sufficient research evidence to indicate which components of reading in alphabetic languages are most critical for later learning. Second, reading is acquired in a multiphase process (with some processes occurring simultaneously) that requires a longer time in some languages than in others. Underpinning the timed components of the assessment in particular is the 'simple view of reading'; namely that comprehension requires both general understanding of a language and the ability to accurately and effortlessly identify words in print (Hoover & Gough, 1990).

The assessment was also informed by the work of Helen Abadzi and others on brain development and the relationship between oral reading fluency and reading comprehension, as

well as the role oral assessment could play in better understanding children's reading skills, particularly in the early grades, before many children could be expected to perform reliably on written, group-administered assessments (Abadzi, 2004, 2006; Abadzi, Crouch, Echegaray, Pasco, & Sampe, 2005; Zieger & Goswami, 2005). A summary of the assessment components and the skills they endeavour to reflect is found in Table 2. The expert panel vetted the instrument, and in 2007 the instrument was piloted and validated in the Gambia, Kenya, Nicaragua, Senegal and South Africa, among others.

Table 2. EGRA subtasks and skills

Skill and approximate timing	EGRA subtask	Skill demonstrated by students' ability to:
Emergent literacy: Birth to Grade 1	Concepts about print (untimed)	Indicate text direction, concept of word or other basic knowledge of print
	Phonemic awareness: identification of onset/rime sounds; phoneme segmentation (untimed)	Identify initial or final sounds of words or segment words into phonemes (words are read aloud to student by assessor)
	Oral vocabulary (untimed)	Point to parts of the body or objects in the room to indicate understanding of basic oral vocabulary
	Listening comprehension* (untimed)	Respond correctly to questions about a passage read aloud to the student by the assessor
Decoding: Beginning Grade 1	Letter identification: names and/or sounds* (fluency, 60 seconds)	Provide the name and/or sound of upper- and lowercase letters or graphemes presented in random order
	Syllable naming (fluency, 60 seconds)	Identify legal syllables presented in random order
	Nonword reading* (fluency, 60 seconds)	Identify nonwords composed of legal syllables presented in random order
	Familiar word reading (fluency, 60 seconds)	Read a list of words drawn from a corpus of frequent words presented in random order
Confirmation and fluency: End of Grade 1 to end of Grade 3	Oral reading fluency (paragraph reading) with comprehension* (fluency, 60 seconds)	Read a narrative or informational text with accuracy, with little effort and at a sufficient rate, and respond to literal and inferential questions about the text they have read
	Dictation (untimed)	Translate sound to print and spell correctly
	Maze or cloze (untimed)	Silently read a passage and select an appropriate missing word (multiple choices are provided in the case of maze)

* Core EGRA subtasks included in nearly all assessments conducted by RTI International. Remaining subtasks vary depending on country and language. Note that all untimed tasks are also time limited (student provided three minutes per task at most).
Source: Adapted from (Gove & Wetterberg, 2011), p. 13.

Of course reading is not the only critical component of early learning. As with reading, the acquisition of mathematics proficiency begins with mastery of fundamental concepts and

competencies in the early grades. Beginning in 2008, RTI began development of a mathematics assessment that could be conducted alongside the reading tool and would not be confounded by reliance on student reading skills; that is an individual, orally administered assessment of mathematics. Instrument development again began with a review of the literature and research on early grade mathematics learning and assessment, and with consultation of expert researchers in the field. The conceptual framework underpinning the instrument emphasizes the critical role of underlying number sense and the progression of skills acquisition toward advanced problem solving (Gove, Habib, Piper, & Ralaingita, 2013; RTI International, 2009a, 2014a). As for reading subtask selection, the criteria for selection of mathematics subtasks included the ability of the tasks to represent a progression of foundational skills, have predictive power, and be both teachable and common in many curricula for early grades (Linan-Thompson & Vaughn, 2007). By mid-2014, EGMA had been conducted in more than 20 countries, most adhering to the framework outlined in Table 3.

Table 3. EGMA subtasks and skills

EGMA subtask	Approximate timeframe of skill acquisition		
	Birth to Pre-K	Pre-K to Grade 1	Grades 2–3
Counting fluency (untimed)	Count out loud from 0 to 20	Count out loud from 0 to 100	Count out loud to numbers 100 +
Counting one-to-one correspondence (untimed)	Count 0 to 0 objects	Count objects from 0 to 100	
Number identification (timed)*		Identify numerals from 0 to 100	Identify numerals from 100 +
Quantity discrimination (untimed)*		Identify which of two numbers 0 to 100 is larger	Identify which of two numbers greater than 100 is larger
Missing number (untimed)*		Identify a missing number in a simple patterns with numbers between 0 and 100	Identify a missing number in a more complicated pattern

EGMA subtask	Approximate timeframe of skill acquisition		
	Birth to Pre-K	Pre-K to Grade 1	Grades 2–3
Word problems (untimed)		Correctly answer word problems involving simple addition and subtraction	Correctly answer word problems involving more complicated addition, subtraction, multiplication, division
Simple addition and subtraction facts (timed)*		Accurately solve basic facts	Accurately solve basic facts with fluency
Complex addition and subtraction (untimed)			Correctly solve addition and subtraction facts with 1- and 2-digit numbers
Shape recognition (untimed)	Recognize basic shapes	Recognize basic shapes	
Shape attributes (untimed)	Recognize basic attributes	Recognize basic attributes	

* Core EGMA subtasks included in nearly all assessments conducted by RTI International. Remaining subtasks vary depending on country. Note that all untimed tasks are also time limited (student provided three minutes per task at most).
Source: Adapted from the EGMA Toolkit (RTI International, 2014a).

Largely due to USAID and other donor support for their use as well as the open-source nature of the assessments, toolkits and guidance notes, EGRA and its mathematics counterpart, EGMA, experienced rapid growth. Toolkits guiding users in the creation of the EGRA (RTI International, 2009b) and EGMA (RTI International, 2014a) and Guidance Notes for EGRA implementation (RTI International & International Rescue Committee, 2011) were developed to support the dozens of government and non-government users in improving the design, implementation, analysis and reporting of early learning assessment results. Building on this widespread use and developing sense of community, RTI supported the publication of a call to action for early reading; entitled 'Early Reading: Igniting Education for All,' the report summarized available early reading assessment data to date and argued for reading as a central indicator of quality in the post-2015 goals (Gove & Cvelich, 2011). In 2010, Tangerine®, an open-source application optimized for collecting EGRA and EGMA results, was launched; by

mid-2014 more than twenty organizations had used Tangerine to collect a half million student records in more than thirty countries (RTI International, 2014d). Many of these organizations, such as Bridge Academies International, Aga Khan Foundation and Save the Children, created their own adaptations of the assessments for use in their projects. As of mid-2014, two-thirds of the more than 160 EGRA applications had been conducted by organizations other than RTI; EGRA had been applied in more than 60 countries and 100 languages (RTI International, 2014b).

With the ever expanding use of EGRA so too have grown the number of critiques surrounding the approach and potential uses (and misuses) of the results. Among the most common criticisms has been the relative prioritization of early foundation skills in the balance of subtasks in the assessment: 'EGRA tests are called reading assessments. But actually their component skills are skewed towards decoding' (Brooker & Fearnley-Sander, 2013). The implication of this focus, the authors state, is to similarly skew pedagogy towards a focus on automaticity and decoding, an approach that risks leaving out the whole point of reading: comprehension. Klees (2012) and Hoffman (2012) also warned of the dire consequences of a too-narrow focus on reading or particular approaches to reading assessment (which they concluded necessarily lead to a narrowing of instructional approaches). Others cautioned against establishing fluency (item and words per minute) targets across multiple languages, given differences in orthographic complexity (Graham & van Ginkel, 2013). The authors warned that the impact of these language differences, including variation in the words per minute score at which children were achieving at least 80 per cent correct on the associated comprehension segment, makes a single, universal words-per-minute benchmark ill-advised.

In all cases, the warnings mirror those found in RTI's own documentation about the assessment tools. First, from the very early days it was clear that a focused attention to reading would generate some controversy. Anticipating this response, the toolkit states:

> A perception seems to exist that the EGRA efforts are trying to convey the notion that 'reading is all that matters.' In those cases it is important to note that reading is indeed an important foundational skill that influences academic success across the school curriculum, and also that reading is a good marker for overall school quality, but that, indeed, the effort is not based on the assumption that reading is all that matters (RTI International, 2009b, p. 49).

Regarding the balance of skills tested and the implications for instruction, the following passage reflects the design intent of the instrument and acknowledges the central role of the most basic skills.

> EGRA's design and emphasis on early reading skills, and in particular phonics and phonemic awareness, means that the initial components of the assessment are not suitable, as designed, for children in upper grades. (This recommendation assumes that students have acquired the foundation skills in the early grades; decisions about use of EGRA should be skill- rather than age-dependent and should rely on local knowledge of students' rate of skill acquisition, if available.) Once the lessons of phonemic awareness and phonics are fully incorporated into the child's reading process, it is no longer appropriate to focus on these skills, through either assessment or instruction. That is, phonics instruction is time-limited, whereas language comprehension and vocabulary instruction are lifelong practices that can and should be both assessed and taught. As children move from 'learning to read' to 'reading to learn,' the balance of instruction will change as well (Espin & Tindal, 1998; International Reading Association, 2007). (RTI International, 2009b, p. 16).

Indeed, the focus of the instrument is on a set of initial skills that the literature supports as being necessary but not sufficient for later reading skills. Unfortunately as the data from dozens of

assessments show, many students lack the opportunity to gain even these most basic skills. Shining a light on early acquisition of a particular skill does not imply that other skills aren't critical. Rather, the assessment seeks to understand what skills students have mastered and to build on those to inform the design or revision of teaching and learning materials and the accompanying instructional methods (Dubeck and Gove, 2015). Perhaps the best argument for the commitment to a balanced approach to reading instruction (one that includes adequate time spent on a range of skills appropriate for a child's level) is the collection of student and teacher learning materials that have been developed following administration of the assessments. A more thorough examination of the instructional materials, available by country at www.eddataglobal.org, reveals the critical role that comprehension plays, from the very first lesson, in the approach to teaching and learning.

Regarding a global fluency target, RTI's studies and other research have repeatedly shown that factors including word length, consistency of letter-sound correspondence and use of the mother tongue as the language of instruction all play important roles in the relationship between fluency and comprehension, making the establishment of a single global target for fluency both ill-advised and not technically sound. As stated in the EGRA toolkit:

> As languages have different levels of orthographic transparency, it would be unfair 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, and comparing these grades, will be a useful analytical and policy exercise, as long as it is not used for 'rankings' or 'league tables' or for the establishment of a single universal standard for, say, reading fluency or automaticity (RTI International, 2009b, p. 11).

Additional presentations and papers have repeatedly made the case that country teams are best positioned to both measure and report against an indicator tracking the percentage of children meeting locally determined learning targets, whether measured by early learning assessments or with other tools:

> A key message behind these targets is that countries should measure and establish their own transparent learning targets in accordance with local curricular goals, but with global level monitoring and support for measurement. The emphasis on local ownership of both goals and metrics, coupled with timely application of appropriate tools for measurement and improvement, are promising from both a political and practical standpoint – countries invested in the process of setting their own goals are more likely to measure and track them, as well as make efforts to improve, with the eventual goal that all children meet the locally established benchmarks (Gove, 2012).

In sum, the RTI toolkit for EGRA, and ongoing applications of the tool, reveal that EGRA was not developed to generate an exclusive focus on phonics, to narrow the curriculum or to create a single, universal word per minute goal for the world's learning readers. Rather, EGRA requires ongoing collaborative efforts with country counterparts to develop locally driven learning goals, and the considerable publicly available documentation, research, books, materials and lesson plans that have been produced in the wake of the assessment show EGRA to be an effective device both for assessment and for consequent generation of educational reform and improvement.

In addition to USAID's efforts in support of EGRA and EGMA, rapid household-based assessments of basic mathematics and reading skills were developed around the same time. Pratham, an Indian NGO, published its first Annual Status of Education Report (ASER—*aser* means impact in Hindustani) in 2005, documenting low learning levels throughout India

(Pratham, 2005). Pratham was founded in 1996 with the goal of helping children in rural villages and urban slums master basic reading and mathematics skills. The idea for a national survey of basic reading and mathematics skills came about following reflection that while India was well on its way to achieving universal primary enrolment, there was little information, at scale, about learning outcomes. ASER is now the largest non-government household surveys of children, some 700,000 of whom are assessed each year by more than 25,000 volunteers in 15,000 villages (ASER Centre, 2014). A 2012 study of the ASER and EGRA reading assessment tools found concurrent validity coefficients ranging from 0.90 to 0.94, indicating that the ASER test is very highly correlated with the EGRA battery (Vagh, 2010). Building on ASER's success in engaging political leadership in data-based discussions about learning outcomes, Pratham began supporting the development of similar assessments in Pakistan (2008), Tanzania, Kenya and Uganda (2009), Mali (2011) and Senegal (2012). Those in East Africa are called Uwezo ('capability' in Swahili), while the Mali effort is called Beekungo ('we are in it together') and in Senegal, Jangandoo ('learn together'). In 2011, these citizen-led assessments reached more than one million children in south Asia and sub-Saharan Africa (ASER Centre, 2014).

Both EGRA/EGMA and the ASER-like assessments have had a significant impact on policy and planning within the countries where the assessments have been conducted. The following brief examples provide an overview of some of the changes that have come about as a result of the use of early learning assessments; additional and more detailed examples can be found later on in the paper:

The Gambia. In 2007, the World Bank Task Team Leader for the Gambia Education Programme encouraged his Gambian counterparts to volunteer to participate in one of the first applications of EGRA, with the goal of improving understanding of learner performance. With technical assistance provided by RTI and support from the World Bank, Gambia Department of

Education staff developed and conducted the assessment in forty schools throughout the country; 54 per cent of third graders were unable to read a single word (Sprenger-Charolles, 2008). Subsequent assessments, in 2009, 2011 and 2013, were conducted entirely by the Gambian team, following additional investments in training and capacity development. Motivated by the poor performance, the Gambia expanded support for reading instruction in the early grades through the expansion or creation of several programmes (World Bank, 2014a). Results indicate that average reading fluency more than doubled between 2009 and 2013, a promising development. Furthermore, the low prevalence of English (the 2007 EGRA survey results indicated that only 2 per cent of students spoke English in the home) led to the creation of the Early Literacy in National Languages pilot programme to support the development of books, materials and training for teachers in five languages. According to the Department's Ousmane Senghor, Senior Programme Officer at UNESCO, the increased use of assessments like EGRA has helped the Gambia to shift from a system that used assessment mainly for selection to one that is focused on using results to inform teaching and learning (2014).

Liberia. In 2008, during a conference on early reading assessment hosted by the World Bank, the Minister of Education approached the USAID and World Bank teams in search of support for the development of a reading assessment and improvement programme. Following a national-level baseline study, RTI worked with Ministry staff to develop and implement a randomized controlled trial (at the school cluster level) of a reading programme in 120 schools. After eighteen months, students in the full treatment group outperformed their peers in all reading skills, nearly tripling the gains made by the control group in oral reading fluency and comprehension. The full treatment group accelerated children's learning at the equivalent of three years of schooling in one year, with an overall average effect size of 0.8 standard

deviations (SD; (Piper & Korda, 2011). The programme helped to demonstrate that assessment coupled with instructional support for teachers can lead to dramatic improvements.

Senegal. Despite relatively poor performance (18 per cent zero scores in oral reading fluency for Grade 3) (Pouezevara, Sock, & Ndiaye, 2010), Senegal's experience with EGRA did not immediately lead to intense government action in support of improving learning outcomes. Factors contributing to this lack of take-up on the part of the government include the brief timeline permitted for the assessment and the low level of engagement with Senegalese authorities by the implementing organization; based on this, the authors state: 'we can conclude that as a result of these two major factors, the national government of Senegal felt little ownership of the results and, not surprisingly, sensed less urgency concerning either the uptake of the results or follow-up for changing policy and practice' (Mejía & Pouezevara, 2011).

Subsequent efforts, including the development and implementation of a national household-based survey based on the ASER/Uwezo model and funded in part by external donors, including the William and Flora Hewlett Foundation, have had greater success in mobilizing government and civil society to respond. The nationally representative Jangandoo survey of more than 5,000 households in 2013 was expanded to 10,000 in 2014. The survey has generated considerable publicity, though it remains to be seen if the survey's recommendations, including expansion of mother-tongue programming and use of mother tongue as the language of instruction, are enacted by the government.

Mali. Mali has participated in several applications of EGRA, at both national and project levels, with the support of multiple external donors, including USAID and the World Bank. Under the USAID-funded PHARE (*Programme Harmonisé d'Appui au Renforcement de l'Education* –Programme for Harmonization and Support of Education) project, baseline and midterm assessments were conducted prior to the 2012 coup d'état that effectively ended the

programme. The 2009 EGRA results revealed Grade 2 zero scores for oral reading fluency in excess of 90 per cent for French and the four additional languages in which the assessment was conducted: Bamankan (Bambara), Bomu, Fufulde and Songhoi. A follow-on 2011 assessment has not yet been authorized for release by the Ministry of Education. A summary of the experience conducting EGRA for the purpose of impact evaluation can found in Ralaingita and Wetterberg (2011).

In 2012, following multiple years of support from the Hewlett Foundation, OMAES (*Œuvre Malienne d'Aide à l'Enfance du Sahel*) conducted the Beekungo among 23,149 children in a regionally representative sample. Across Malian regions, the percentage of students proficient in Grade 2 reading skills ranged from 27.1 per cent to 78.1 per cent.[3] Again, it remains to be seen whether large-scale impact and change can result from either of these assessment approaches.

Indicator and Strategy Development

In addition to the above country-level experiences, the rapid growth of early learning assessments has had a considerable impact on how global donors and agencies frame the importance of measureable, actionable learning targets. With a growing number of approaches and sources of information on early learning outcomes available in low-income countries, education staff at the Fast Track Initiative (FTI) began planning for an expert review panel to propose a framework for global reading goals. In January 2011, FTI convened a two-day meeting of a twelve-member panel, including linguists, psychometricians, psychologists, reading researchers and statisticians representing ten countries, from Chile to Kenya. The panel,

[3] The Education Policy Data Center (EPDC) website hosts Beekungo data, descriptions of the learning outcomes benchmark indicators, and Beekungo supplementary indicators. See more at: http://www.epdc.org/epdc-data-points/epdc-spotlight-mali#sthash.BhQqpCA0.dpuf

observed by representatives from the UK Department for International Development (DFID), USAID, the World Bank and George Washington University, proposed two indicators for immediate adoption by FTI, as follows:

- Proportion of students who read with understanding by the end of two years of primary schooling
- Proportion of students who read with sufficient understanding to 'read to learn' by the end of primary school (between four and six years of schooling) (FTI Reading Indicator Panel, 2011)

One month later, USAID released its 2011–2015 Education Strategy (United States Agency for International Development, 2011). The final USAID version, as defined in the strategy and adopted into the Standard F indicators framework (US Department of State, 2014), can be found below:

- Proportion of students who, after two years of schooling, read with sufficient fluency and comprehension to 'read to learn'
- Proportion of students who are able to read with comprehension, according to their countries' curricular goals, by the end of primary school

While the wording varies slightly, the intention of the indicators is the same: to measure and report on early reading outcomes and to do so within the first two years of primary school. For unknown reasons, the FTI panel recommendations were never formally adopted by FTI, which later became the Global Partnership for Education (GPE). Instead GPE opted for a less controversial approach, to reduce by half the number of non-readers in partner countries. USAID's indicators, on the other hand, are now required on all USAID-funded basic education reading projects, approximately thirty of which were being implemented in early-2015.

The focus on reading as a central objective of the USAID education strategy was not without controversy. In public meetings and workshops, USAID officers were frequently forced to defend the new, restricted approach. Within the year, revised strategies from both the World Bank (2011) and DFID (2010) were released, both putting learning clearly at the centre of their efforts. None was as specific as USAID's however, in identifying reading as a leading indicator of general school and system quality.

With 2015 as the next major milestone for the end of the Millennium Development Goals and the redesign of new global goals and indicators, including education, fast approaching and no clear consensus on how to measure and report on learning, the Brookings Institution's Center for Universal Education, with support from the William and Flora Hewlett Foundation, among others, began work on the Learning Metrics Task Force (LMTF). Much has been and will be written about the development of the post-2015 goals, but the LMTF has played and will play a critical role in ensuring that learning, in a clear and measureable way, is at the heart of the education goals. Results from early learning assessments, including both ASER/Uwezo and EGRA/EGMA tools, provided an important initial wake-up call for the global community. The next section highlights some of the national results stemming from the EGRA and EGMA tools, followed by case studies of how these results generated action at the national level in several countries.

Learning in crisis: Results from selected national early learning assessments

The results of this section focus on the oral reading fluency section of EGRA for national-level samples. These data were collected through a school-based sampling approach and weighted so that national estimates could be provided. Results are provided only for those countries for which

permission for release was received and for those samples that are nationally representative. National estimates for the other EGRA and EGMA subtasks are available in Appendices 1 through 3.

Table 4 shows the percentage of students scoring zero on oral reading fluency (correct words per minute) disaggregated by country, year, language and grade (see Appendix 1 for additional reading scores by subtask; Appendix 2 contains mathematics scores). Students were assessed in the language of instruction. Therefore, comparisons between countries are not comparing 'apples to apples'. As noted earlier, differences between structure and learning of languages vary significantly; furthermore, in some countries a percentage of students learn in a language that may not be their mother tongue. Additionally, the EGRA has been administered to students in different grades from country to country. These caveats notwithstanding, it is important to give the reader a general sense of performance on a task that is meant to emulate what students should be doing regularly in their classrooms: reading aloud. A score of zero on this subtask means that students were unable to read aloud a single word of a Grade 2 reading passage. Reading passages are informed by word lists generated from existing student materials and are aligned with the national curriculum. It is also important to note that because this is school-based sampling, the population of inference is only students attending school.

Table 4. Percentage of students scoring zero in oral reading fluency, by country, year, language, grade

Country	Year	Language	Grade	EGRA subtask	Percentage of students scoring zero	95% confidence interval	Number of students in sample
Ghana	2013	Akuapem	Grade 2	Oral Reading Fluency	64.6%	(57%, 72.2%)	689
Ghana	2013	Asanti	Grade 2	Oral Reading Fluency	82.7%	(78.6%, 86.8%)	1634
Ghana	2013	Dagaare	Grade 2	Oral Reading Fluency	85.9%	(79%, 92.7%)	541
Ghana	2013	Dagbani	Grade 2	Oral Reading Fluency	87.4%	(81.9%, 92.9%)	432
Ghana	2013	Dangme	Grade 2	Oral Reading Fluency	58.1%	(48%, 68.2%)	447
Ghana	2013	English	Grade 2	Oral Reading Fluency	67.5%	(58.9%, 76.1%)	492
Ghana	2013	Ewe	Grade 2	Oral Reading Fluency	81.1%	(76%, 86.3%)	692
Ghana	2013	Fante	Grade 2	Oral Reading Fluency	67.2%	(58.7%, 75.8%)	430
Ghana	2013	Ga	Grade 2	Oral Reading Fluency	76.6%	(69.6%, 83.6%)	423
Ghana	2013	Gonja	Grade 2	Oral Reading Fluency	91.5%	(88.3%, 94.6%)	439
Ghana	2013	Kasem	Grade 2	Oral Reading Fluency	82.7%	(78.3%, 87.1%)	442
Ghana	2013	Nzema	Grade 2	Oral Reading Fluency	64.6%	(39.3%, 51.5%)	689
Guyana	2008	English	Grade 2	Oral Reading Fluency	34.8%	(24.8%, 44.9%)	926
Guyana	2008	English	Grade 3	Oral Reading Fluency	22.7%	(14.7%, 30.7%)	898
Guyana	2008	English	Grade 4	Oral Reading Fluency	13.8%	(10.2%, 17.4%)	874
Iraq	2012	Arabic	Grade 2	Oral Reading Fluency	34.2%	(26.5%, 41.9%)	580

Country	Year	Language	Grade	EGRA subtask	Percentage of students scoring zero	95% confidence interval	Number of students in sample
Ghana	2013	Akuapem	Grade 2	Oral Reading Fluency	64.6%	(57%, 72.2%)	689
Iraq	2012	Arabic	Grade 3	Oral Reading Fluency	17.5%	(9.9%, 25.1%)	573
Jordan	2012	Arabic	Grade 2	Oral Reading Fluency	20.8%	(15.6%, 25.9%)	1514
Jordan	2012	Arabic	Grade 3	Oral Reading Fluency	19.7%	(14.9%, 24.4%)	1532
Malawi	2010	Chichewa	Grade 2	Oral Reading Fluency	94.5%	(91.6%, 97.4%)	1973
Malawi	2010	Chichewa	Grade 4	Oral Reading Fluency	54.7%	(47.1%, 62.3%)	480
Malawi	2011	Chichewa	Grade 2	Oral Reading Fluency	95.6%	(94.3%, 97%)	1525
Malawi	2011	Chichewa	Grade 4	Oral Reading Fluency	44.7%	(41.1%, 48.4%)	1487
Malawi	2012	Chichewa	Grade 2	Oral Reading Fluency	90.2%	(86.7%, 93.7%)	3360
Malawi	2012	Chichewa	Grade 4	Oral Reading Fluency	39.1%	(32.6%, 45.5%)	1839
Nepal	2014	Nepali	Grade 2	Oral Reading Fluency	36.9%	(30.7%, 43.1%)	2570
Nepal	2014	Nepali	Grade 3	Oral Reading Fluency	18.9%	(15.4%, 22.5%)	2513
Nicaragua	2008	Spanish	Grade 2	Oral Reading Fluency	6.4%	(3.9%, 9%)	2164
Nicaragua	2008	Spanish	Grade 3	Oral Reading Fluency	0.9%	(0.4%, 1.5%)	2218
Nicaragua	2008	Spanish	Grade 4	Oral Reading Fluency	0.1%	(0%, 0.1%)	2267
Rwanda	2011	English	Grade 6	Oral Reading Fluency	2.4%	(-0.8%, 5.6%)	420
Senegal	2009	French	Grade 3	Oral Reading Fluency	4.4%	(0.4%, 8.4%)	588

Country	Year	Language	Grade	EGRA subtask	Percentage of students scoring zero	95% confidence interval	Number of students in sample
Ghana	2013	Akuapem	Grade 2	Oral Reading Fluency	64.6%	(57%, 72.2%)	689
Tanzania	2013	Kiswahili	Grade 2	Oral Reading Fluency	27.7%	(20.1%, 35.3%)	2266

Table 5 shows the potential difference socio-economic status (SES) can make within a country. For each country, a single socio-economic status indicator was created using student interview questions, such as 'Does your family have a television?' Relevant questions were compiled into a linear combination using principal components analysis. See Appendix 4 for more details on the following: content of the student questions, how the index is constructed and composition by country of the SES indices.

The final column in the table shows the percentage change of oral reading scores between the bottom SES quintile and top SES quintile. Even in countries and languages where the percentage of zero oral reading scores was low, the percentage change can be quite different. For example, for Senegal Grade 3, the bottom SES quintile had 8.2 per cent of students scoring zero, which is encouraging, but when compared with 2.5 per cent of students scoring zero for the top SES quintile, there were indications of inequality. In countries where the percentage of students scoring zero in reading fluency was very high, the percentage of zero scores had a small percentage change between the bottom SES quintile and the top SES quintile; for example, in Malawi, 99.0 per cent of Grade 2 students in the lowest SES quintile had zero reading scores compared to 93.5 per cent in the top SES quintile. Overall, 94.5 per cent of students in Grade 2 in 2010 in Malawi were unable to read. Students in general could not read no matter their background.

Some results in the table indicate that for certain countries, the SES index was not effective. These are the cells that are not highlighted in the final column. The reasons behind this could be explained by other student questions not included in the instrument. Other explanations could be attributed to students' misunderstanding or incorrectly responding to questions for cultural reasons, or possibly to a reduced sample size due to a low response rate for certain questions.

Table 5. Percentage of students scoring zero in oral reading fluency for bottom and top socio-economic quintile, country, year, language, grade

Country	Year	Language	Grade	Percentage oral reading score zero	Percentage oral reading score zero - bottom SES quintile	Percentage oral reading score zero - top SES quintile	Percentage change – bottom SES quintile versus top SES quintile
Nepal	2014	Nepali	Grade 2	36.9%			
Nepal	2014	Nepali	Grade 3	18.9%			
Tanzania	2013	Kiswahili	Grade 2	27.7%			
Ghana	2013	Akuapem	Grade 2	64.6%	77.5%	60.7%	21.7%
Ghana	2013	Asanti	Grade 2	82.7%	84.5%	78.3%	7.3%
Ghana	2013	Dagaare	Grade 2	85.9%	88.3%	70.5%	20.2%
Ghana	2013	Dagbani	Grade 2	87.4%	86.9%	74.7%	14.0%
Ghana	2013	Dangme	Grade 2	58.1%	74.4%	47.3%	36.5%
Ghana	2013	Ewe	Grade 2	67.5%	74.1%	58.1%	21.5%
Ghana	2013	Fante	Grade 2	81.1%	94.6%	80.5%	15.0%
Ghana	2013	Ga	Grade 2	67.2%	84.2%	76.4%	9.3%
Ghana	2013	Gonja	Grade 2	76.6%	95.3%	82.1%	13.8%
Ghana	2013	Kasem	Grade 2	91.5%	90.9%	77.2%	15.1%
Ghana	2013	Nzema	Grade 2	82.7%	88.3%	70.5%	20.1%

Country	Year	Language	Grade	Percentage oral reading score zero	Percentage oral reading score zero - bottom SES quintile	Percentage oral reading score zero - top SES quintile	Percentage change – bottom SES quintile versus top SES quintile
Iraq	2012	Arabic	Grade 2	34.2%	28.2%	29.4%	-4.3%
Iraq	2012	Arabic	Grade 3	17.5%	27.8%	10.3%	62.8%
Jordan	2012	Arabic	Grade 2	20.8%	37.7%	14.7%	60.9%
Jordan	2012	Arabic	Grade 3	19.7%	38.9%	15.7%	59.5%
Malawi	2010	Chichewa	Grade 2	94.5%	99.0%	93.5%	5.6%
Malawi	2010	Chichewa	Grade 4	54.7%	46.6%	52.7%	-13.1%
Malawi	2011	Chichewa	Grade 2	95.6%	95.9%	93.3%	2.7%
Malawi	2011	Chichewa	Grade 4	44.7%	47.5%	37.6%	20.7%
Malawi	2012	Chichewa	Grade 2	90.2%	91.2%	89.7%	1.6%
Malawi	2012	Chichewa	Grade 4	39.1%	39.8%	36.2%	9.0%
Nicaragua	2008	Spanish	Grade 2	6.4%	11.7%	4.0%	65.9%
Nicaragua	2008	Spanish	Grade 3	0.9%	1.2%	0.2%	85.5%
Rwanda	2011	English	Grade 6	2.4%	1.9%	1.2%	34.4%
Senegal	2009	French	Grade 3	4.4%	8.2%	2.5%	69.9%
Mali	2009	Bamanankan	Grade 2	81.5%	86.0%	79.2%	7.9%
Mali	2009	Bomu	Grade 2	91.2%	91.3%	83.2%	8.9%

Country	Year	Language	Grade	Percentage oral reading score zero	Percentage oral reading score zero - bottom SES quintile	Percentage oral reading score zero - top SES quintile	Percentage change – bottom SES quintile versus top SES quintile
Mali	2009	Fulfulde	Grade 2	92.2%	96.9%	92.2%	4.9%
Mali	2009	Songhoi	Grade 2	83.6%	85.6%	84.3%	1.6%

The distribution of oral reading fluency scores in Table 5 highlights perhaps more than any table the challenge that ministries have in improving reading fluency in early grades. For example, Grade 2 Nepal reported 36.9 per cent zero reading fluency scores (from Table 5); however, 55 per cent of students had a fluency rate of 0 to 10 words per minute, and cumulatively 69.8 percent of students could read between 0 and 20 words per minute. Education research indicates that this reading rate is too slow for reading comprehension.

Malawi has three years' worth of data. Grade 2 (from Figure 1) showed little progress with per cent zero reading fluency at 94.5, 95.6 and 90.2 per cent for years 2010, 2011 and 2012 respectively. However, Grade 4 in Figure 2 showed some potential indication of a shifting distribution of reading fluency. The percentage of 0 to 10 scores had a decreasing trend; 61.0, 55.0 and 52.2 per cent for years 2010, 2011 and 2012, but the percentage of students scoring up to 30 showed no decreasing trend at 83.3, 77.5 and 81.4 per cent for years 2010, 2011 and 2012 respectively. While these reading rates for Grade 4 were still very low, resulting in a probable lack of reading comprehension, they demonstrate that ongoing measurements can show trends and changes.

Figure 1. Distribution of oral reading fluency scores for Malawi, Grade 2, 2010–2012

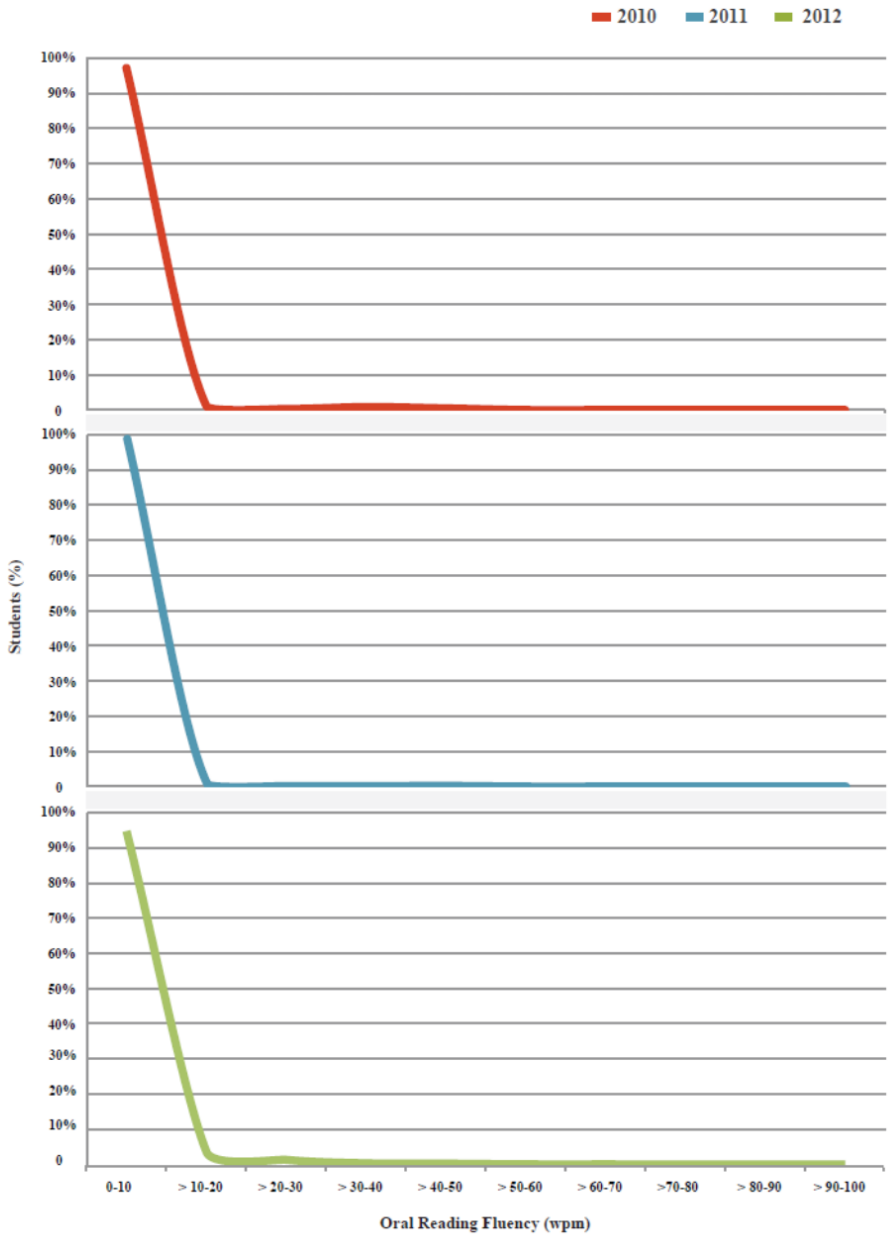
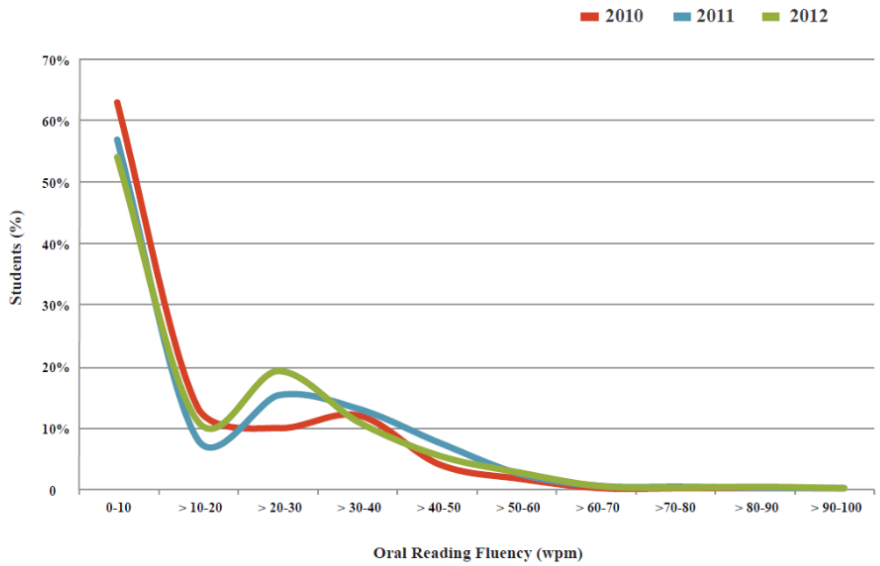


Figure 2. Distribution of oral reading fluency scores for Malawi, Grade 4, 2010–2012



Looking at Grades 2 and 3, the only countries demonstrating reasonable levels of reading fluency were Senegal (Figure 3) and Nicaragua (Figure 4). Distributions for oral reading fluency disaggregated by country, language, grade and year are in Appendix 3.

Figure 3. Distribution of oral reading fluency scores for Senegal, Grade 3, 2008

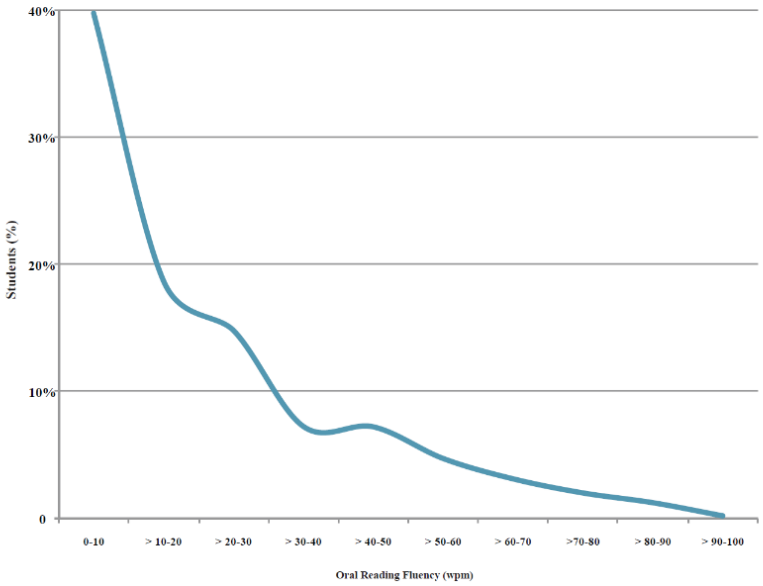
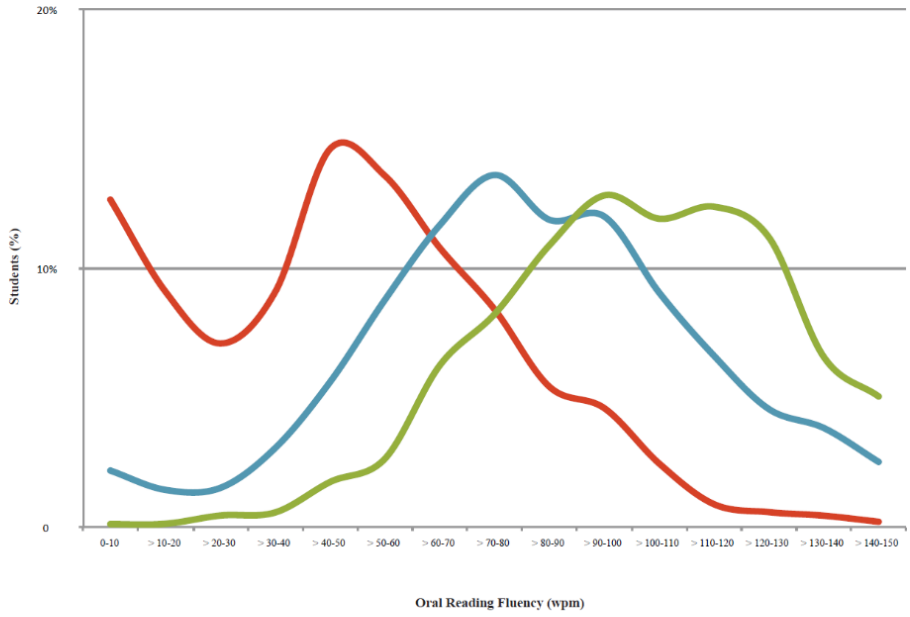


Figure 4. Distribution of oral reading fluency scores for Nicaragua, Grades 2–4, 2008



As a single 'snapshot', these distributions create an indication of reading fluency at a point in time. Reporting on oral reading fluency is a powerful indicator by which ministries can track progress beyond the average reading fluency or percentage of students who score zero; this can be helpful for ministries when implementing curriculum programmes or designing teacher training programmes. It is worth pointing out that following EGRA and EGMA reporting, many national-level education programmes have been implemented, and some of these countries may already be showing improvement with these distributions. Clearly, ongoing annual measurements will be critically important in guiding educational policy.

Measurements of student reading and comprehension fluency give indications how well students are doing, but they do not inform us why. There are many explanations of student scores, and we can add student interview questions to assessments to inform us of some of those reasons. Table 6 shows individual country regression model coefficients of student performance based on student interview questions and oral reading scores as the response variable. Although for many countries, grade and gender are common indicators of student achievement, there are also other indicators of student achievement. While sample size plays a part in the statistical significance of the indicators, there are trends across countries that show some student questions are almost always associated with student performance. For example, Tanzania ($p<0.001$), Iraq ($p<0.05$) and Nepal ($p<0.001$) showed an association between student success and that student's reporting of reading to someone at home, while Tanzania ($p<0.001$), Jordan ($p<0.05$), Nicaragua ($p<0.01$) and Nepal ($p<0.01$) demonstrated a positive association between reading materials at home and student reading performance.

There are also student questions that are indicators of challenges that students face with their education. For example, repeating a grade had significant associations with decreased student scores in Tanzania ($p<0.01$), Iraq ($p<0.001$), Jordan ($p<0.001$) and Malawi ($p<0.01$), and

an absence for part of the previous week was associated with lower student scores in Ghana ($p<0.001$), Iraq ($p<0.001$) and Jordan ($p<0.001$).

While many of the results from the student questionnaires provoke thought and reflection, it has been noted that these questions are being asked to mostly second grade students with an average age of about eight years. Additionally, while student anonymity is of paramount importance in the data and published results, the questions are asked by an adult assessor. With that in mind, it is reflected on that perhaps not all children, if asked whether their parents can read, will give a fully honest response. For example, for the Senegal student questionnaire, if students responded that their father could read, a negative coefficient for this variable was the result. In other words, if a child said the father could read, the child was less likely to be able to read.

Table 6. Country regression models of indicators of student success

	Tanzania		Ghana		Iraq		Jordan		Malawi		Nicaragua		Rwanda		Senegal		Nepal	
Response Variable	ORF		ORF		ORF		ORF		ORF		ORF		ORF		ORF		ORF	
	Coeff.	t score	Coeff.	t score	Coeff.	t score	Coeff.	t score	Coeff.	t score	Coeff.	t score	Coeff.	t score	Coeff.	t score	Coeff.	t score
Grade					11.87***	(6.57)	9.801***	(8.97)	6.055***	(14.58)	28.93***	(17.42)					12.55***	(11.59)
Gender (female)	2.386*	(2.40)	-0.904***	(-2.67)	4.386**	(3.04)	4.655***	(4.21)	0.310	(1.00)	11.49***	(5.88)	-0.236	(-0.08)	-3.505	(-1.02)		
Repeating grade	-7.474**	(-3.32)			-10.81***	(-7.21)	-8.229***	(-3.41)	-1.674**	(-2.59)	3.139	(0.72)			-6.767	(-1.69)	-1.082	(-0.57)
Preschool	2.653	(1.95)	1.592***	(3.63)	-1.782	(-1.10)	3.942**	(3.10)			-0.412	(-0.13)						
Had breakfast this morning	0.257	(0.18)	-0.0164	(-0.04)	1.454	(0.99)	1.663	(1.37)									5.508*	(2.24)
Positive teacher response after test	3.138*	(2.56)			3.637	(1.89)	2.373	(1.08)			8.457***	(4.25)	-11.32	(-1.23)				
Neutral teacher response after question	0.621	(0.20)			3.152*	(2.15)	6.649***	(3.66)					-3.912	(-0.80)				
Positive teacher response after question	1.501	(0.98)			3.637	(1.40)	9.552***	(3.59)					-4.835	(-0.94)				
Assigned homework last week	-1.446	(-0.84)			-1.270	(-0.89)	1.675	(1.11)										
Receives help at home with homework	-0.106	(-0.06)	1.072**	(2.98)	0.273	(0.21)							5.313*	(2.59)			2.663	(1.83)

	Tanzania		Ghana		Iraq		Jordan		Malawi		Nicaragua		Rwanda		Senegal		Nepal	
Response Variable	ORF		ORF		ORF		ORF		ORF		ORF		ORF		ORF		ORF	
	Coeff.	t score	Coeff.	t score	Coeff.	t score	Coeff.	t score	Coeff.	t score	Coeff.	t score	Coeff.	t score	Coeff.	t score	Coeff.	t score
Absent for part of last week	0.0179	(0.01)	-1.937***	(-4.46)	-3.372**	(-3.46)	-4.284***	(-4.85)			-3.310	(-1.60)					0.126	(0.11)
Positive parent response after receiving a good grade	7.423***	(6.22)			3.086	(1.20)											0.966	(0.74)
Read to someone at home	9.610***	(6.09)			2.791*	(2.46)											8.106***	(5.92)
Reading materials at home	7.322***	(7.60)					6.874***	(6.71)			5.976**	(2.74)			3.620	(1.38)	4.639**	(3.31)
Mother reads	1.872	(0.92)													4.162	(1.48)	1.294	(1.01)
Father reads	0.453	(0.25)													-3.288	(-1.02)	-1.033	(-0.83)
Someone reads to you at home					1.869	(1.18)					-6.225*	(-2.27)					0.245	(0.16)
Has mother tongue language reader book									2.356**	(3.17)					10.98***	(4.41)		
Absent for more than one week									-1.542***	(-3.70)								
Intercept	-1.454	(-0.55)	2.783***	(3.69)	-24.55***	(-4.11)	-24.09***	(-5.00)	-11.15***	(-13.23)	-19.66**	(-2.88)	52.50***	(3.98)	15.90***	(5.32)	-23.77***	(-7.95)

	Tanzania		Ghana		Iraq		Jordan		Malawi		Nicaragua		Rwanda		Senegal		Nepal	
Response Variable	ORF		ORF		ORF		ORF		ORF		ORF		ORF		ORF		ORF	
	Coeff.	t score	Coeff.	t score	Coeff.	t score	Coeff.	t score	Coeff.	t score	Coeff.	t score	Coeff.	t score	Coeff.	t score	Coeff.	t score
OVERALL MODEL	F Score	P-val.	F Score	P-val.	F Score	P-val.	F Score	P-val.	F Score	P-val.	F Score	P-val.	F Score	P-val.	F Score	P-val.	F Score	P-val.
	5.754	0.052	6.832	<0.001	10.71	<0.001	17.17	<0.001	86.04	<0.001	63.84	<0.001	1.284	0.350	4.629	0.006	14.52	<0.001
Observations	1844		6458		982		2676		10457		1696		409		571		2889	

* p<0.05 ** p<0.01 *** p<0.001

Capturing national attention: Case studies

The following five case studies draw from published reports and staff reflections on the process of gaining national attention for improving learning outcomes in the early grades. Each case study includes a brief background section, followed by a summary of the implementation process, results and next steps.

Egypt

Background

Despite long-standing commitments to literacy and learning (with primary education compulsory since 1923), Egypt, a middle-income country with near-universal access to education, is plagued by persistent regional and gender inequalities, with girls and those residing in Upper (southern) Egypt particularly disadvantaged. In an effort to help close these gaps, in 2008 USAID launched the Girls' Improved Learning Outcomes (GILO) Project, designed to expand access to quality education for girls, strengthen school management and improve the quality of teaching and learning in targeted schools and districts in Upper Egypt. GILO specifically targeted 166 schools in 4 governorates with the following: (1) active and meaningful student learning and assessment, (2) girl-friendly materials and pedagogical practices, (3) educator/parental feedback on students' outcomes, (4) teacher training and professional development and (5) information technology equipment and training. From 2008–2010, general quality improvements and child- and girl-friendly instruction were introduced through student-centred active learning, teacher training and improved instructional methodologies.

Although not initially called for in the project design, USAID's implementing partner, RTI International, proposed a small component to trial the first early reading assessment in Arabic as part of the project. The draft assessment, developed and piloted by leading Arabic-

language experts in Cairo in May 2008, was a critical first step in securing political and technical support for integration of the reading assessment tool into the project. A baseline EGRA for students in Grades 2 to 4 was conducted in twenty-eight project-supported and thirty control schools in eleven districts in the Upper Egypt governorates of Fayoum, Minya and Qena. The results were sufficiently poor (47 per cent zero scores in Grade 2 oral reading fluency) to generate considerable concern on the part of government and USAID authorities. Most Grade 2 students tested in both the pilot and control schools were slow in recognizing syllables and reading words; too few had developed basic phonemic awareness skills or alphabetic knowledge. Listening comprehension was also low, likely due to the diglossic nature of Arabic (i.e. difference between everyday spoken Arabic and the classical Arabic taught in schools). Comprehension skills lagged, except among a minority of students who read satisfactorily for their age. In response, the GILO project was asked to develop a remedial programme to help improve student reading results. EGRA in effect opened what had previously been a closed debate about how to teach reading in Arabic in Egypt (Gove et al., 2013).

Process

The resulting Early Grade Reading Programme (EGRP) was developed by a working group of Egyptian Arabic language specialists, Ministry of Education (MOE) staff, teacher educators and other stakeholders, with assistance from RTI staff and consultants. Deriving lessons from the assessment, including the fact that letter sound knowledge was a better predictor of oral reading performance than knowledge of letter names, the programme developers devised a twenty-minute add-on to complement the existing curriculum. Following the development of the supplementary programme materials, including trainers' and teachers' manuals with strategies for explicit literacy instruction, specific early literacy phonics routines and classroom posters that illustrate letters and diacritics (for letter-sound practice), the working group designed and

implemented an eight-day training programme for teachers in Grade 1, including all Arabic-language teachers and supervisors. Training focused on practice in using the new materials and social marketing of the importance of early reading, the science of reading acquisition and the critical role of building a strong early foundation for later success. In addition to the training and supplementary materials, EGRA opened the door to an examination and eventual redesign of the existing textbooks in Grades 1 to 3, which revealed significant flaws with regard to the sequencing, number and frequency of the vocabulary presented to children.

Results

After piloting the EGRP in 166 schools, the GILO and the MOE conducted a second EGRA for Grade 2 students in the same sample of project and control schools. The results of the pilot, provided in Table 7, illustrated significant improvements in treatment schools relative to control schools, with letter-sound knowledge improving by nearly 200 per cent (albeit from a low base).

Table 7. Egypt Early Grade Reading Programme Grade 2 Pilot results, 2009–2011

EGRA subtask	Group	2009 baseline scores (mean)	2011 post-intervention scores (mean)	% change
Letter-sound knowledge (correct letters per minute [clpm])	Control	8.6	10.1	+18 %
	GILO / EGRP	9.8	28.5	+192 %
Decoding of invented words (correct words per minute [cwpm])	Control	5.6	7.5	+34 %
	GILO / EGRP	7.4	15.5	+111 %
Oral reading fluency (cwpm)	Control	8.9	10.9	+23 %
	GILO / EGRP	11.1	21.1	+91 %

Source: RTI International, 2014c.

Based on these results, which together indicated an overall effect size of 0.4 SD, the MOE requested that the programme be rolled out nationally to all students in Grades 1 to 3. By December 2013, the MOE's national scale-up with GILO support directly benefited 4.2 million students in more than 16,000 schools in all 27 of Egypt's governorates. MOE launched EGRP as a 'national project' in 2011 from a new central Early Grade Learning Unit (EGLU), which

coordinated expansion and textbook revision. Training and manuals focused on student-centred learning, classroom management, reading instruction and assessment. Supervisors were trained on reading and coaching, and school leaders on how to support classroom teaching.

EGRP's package included: trainers' manual and teachers' manuals with strategies for explicit instruction, implementation plan, integrated supportive text for literacy instruction, and early literacy phonics routines for teacher training; recommendations on linkages within the existing MOE curriculum; guides and examples for mastery testing of skills for student monitoring and assessment; definitions of reading components; and digital resources including videos and recordings of correct letter-sound pronunciation. All materials and training were certified by the Professional Academy of Teachers (PAT). The project also created an e-portal focused on reading instruction practices for ongoing reinforcement and reference. Now owned and managed by PAT, the e-portal's scripted lessons covered the five Ts (Gove & Cvelich, 2011), identified as important components for improving reading instruction: (1) more time devoted to teaching, (2) better techniques for teaching, (3) more texts in the hands of students, (4) teaching children in the mother tongue and (5) testing, or measurement, of results.

What Next

GILO came to a close in December 2013, but Egypt's EGRP continues, with new textbooks now available for all students in Grades 1 to 3 and more than 4 million students enrolled in Grades 1 to 3 covered by the intervention each year. As of September 2014, the programme had trained more than 200,000 teachers in Grades 1 to 3 in the new approaches. The Council on Foreign Relations' Isobel Coleman called the EGRP a 'reading revolution' (Coleman, 2012), and a case study commissioned by USAID (Nielsen, 2013) identified the following six lessons from the experience:

1. The scientific rigor of EGRA/EGRP is an asset that needs to be safeguarded as advocates, managers and implementers think about/work on cross- or within-country dissemination.

2. A viable model to consider for introducing and/or scaling up early grade reading assessments and interventions is the one followed by Egypt (not necessarily by design but more by default) and that is to implant a modestly funded program at the beginning and then, relying on skillful implementers/contractors and local USAID managers, nurture its growth within and in response to the ever changing political/educational environment, moving briskly at times to seize opportunities, but also gradually growing local ownership and commitment so when a chance does arise for scaling-up, substantial political will and domestic funding will have materialized.

3. No single country, even one as successful as Egypt, can be used as the prototype of how to scale-up an effective early grade reading program, given the unique combination of factors and forces in each country. However, countries should be able to learn lessons from one another for use within their own contexts.

4. An exciting and immediately successful learning system may be more effective in increasing school attendance than more conventional methods to increase access. Such methods, for example, using social promotions or family incentives may be able to bring reluctant children to school *but cannot hold them* if instruction is weak and little is learned. Experience with EGRP has shown (at least anecdotally) that where students enjoy learning and feel a sense of accomplishment, attendance soars.

5. Macro-level instability and fragility is not always detrimental to the success of reform effects – as long as there is a stable corps of visionary managers at the operational level, supportive and sensitive contractors and Agency managers, and some space to innovate under the radar. Once the government of former President Hosni Mubarak fell, even though chaos ensued in the wide political realm, the educational bureaucracy felt liberated and charged with a mandate to move into new realms of nation-building.

6. Effective training and real professional growth of teachers are the keys to creating improved student learning outcomes in low-performing educational systems. From the beginning of EGRP it was clear that in Egypt, as elsewhere, the educational system's main asset and best change agent was the classroom teacher (Nielsen, 2013).

In April 2013, prior to the rollout of training and materials to Grade 3 teachers and students, the MOE supported a national-level assessment of Grade 3 results, intended to serve as a baseline for future comparisons and monitoring of the national programme's progress. In April 2014, a second national assessment was conducted in Grade 3; as of the time of this writing, those results were not yet available.

Kenya

Background

The Kenyan Government, through its Ministry of Education, Science and Technology (MoEST) has been at the forefront of countries interested in evidence of learning outcomes. This includes the SACMEQ I to IV studies in Grade 6 and the country's own National Assessment System for Monitoring Learning Achievement (NASMLA) study, which was undertaken in 2010 and focused on Grade 3 literacy and numeracy outcomes. These efforts have been buttressed by the citizen-led assessment of Uwezo, which is styled after the ASER study in India and assesses pupils between the ages of 6 and 16 on Standard (Grade) 2 level measures in English, Kiswahili and mathematics. Uwezo has been a remarkably effective effort to focus the attention of the country's citizens on education quality across Kenya, with large assessments having been undertaken every year since 2009, with every district assessed and ranked (except for those with security concerns) in the 2013 assessment. Evidence has been part of many other assessments in the country, including many Abdul Latif Jamil Poverty Action Lab (JPAL) and Innovations for

Poverty Action (IPA) studies. It is in this context that the EGRA and EGMA tools have played an important role in the quality of education debate in Kenya.

Process

In 2007, with USAID support, RTI International collaborated with the Aga Khan Foundation to develop a set of literacy assessments that could influence the education quality discussions in the country. Implemented at a very small scale on the coast, and in particular in the Malindi district, these assessments were among the earliest applications of EGRA. The dismal performance of pupils on the initial EGRA in Kenya in 2007 allowed the MoEST to request USAID to allow the Aga Khan Foundation to implement a programme to improve educational outcomes in a handful of schools. Interestingly, while the findings showed that the programme increased learning outcomes in both English and Kiswahili literacy, the changes were not statistically significant from the changes experienced by the control group. Qualitative research revealed that a significant amount of leakage occurred, due to the demand from the community for the educational resources that the programme could provide.

Results

Results from this report were shared with several leadership teams in the MoEST and the Kenya National Examinations Council (KNEC). At the same time, in 2009, RTI International undertook an assessment of literacy outcomes in several mother tongues. This particular EGRA was designed to produce an understanding of how pupils achieved literacy in English, Kiswahili and the ostensible language of instruction in Kenya, the mother tongue. The pupil assessments were compared with language-of-instruction classroom observations, to understand whether pupils' skills were related to the languages that were used for instruction. In fact, the results showed that the primary language utilized by teachers and students in the early part of primary school was English, even in the rural schools that were expected to utilize mother tongue for instruction.

Mother tongue was used only during the mother-tongue lesson on the timetable, and survey results revealed that those mother-tongue lessons on the timetable were often changed to revision classes for English or maths. Unsurprisingly, then, outcomes in English were significantly higher than outcomes in either Kiswahili or mother tongue, at least in the area of oral reading fluency. On the other hand, comprehension scores were significantly higher in mother tongue and Kiswahili than in English, suggesting potentially misplaced priorities by teachers. Findings workshops with the MoEST and KNEC revealed that the policy-makers in Kenya were unsurprised that mother tongue was seldom used. What was surprising were the relatively low outcomes for pupils on English and Kiswahili assessments in Standard 3 (the 2009 EGRA study was undertaken at the very end of Standard 3), and that while pupils could read English relatively well, their understanding of written English was abysmal. This suggested to the Kenyan authorities that instructional improvement programs were necessary.

Due to the useful information that the EGRA study provided, the MoEST and USAID/Kenya decided to pilot the first EGMA in Malindi district on the Coast of Kenya. The EGMA was undertaken in a small sample, and the pilot was done with a core set of experts from across the MoEST, Kenya Institute of Curriculum Development (KICD) and KNEC. Results showed that pupils in Standards 1 to 3 had a range of outcomes, but at all levels, pupils were underperforming the curriculum expectations for particular grade levels. Unlike those in many countries, pupils in Kenya could count and identify shapes and numbers, but even with the heavy emphasis in many textbooks in Kenya on computation and practice, pupils remained both slow in those computations and inaccurate. Tasks that required number sense proved to be an even greater challenge. Findings workshops discussing the EGMA studies reiterated that pupils in Kenya in early primary struggled with the basic skills and that the instructional practices of teachers and the design of the textbooks were the primary problems.

In 2009 and 2010 in Kenya, several voices were saying similar things. The Hewlett Foundation funded several small assessments and studies (including those by RTI and Uwezo) as well as other programs implementing literacy programs, including the Aga Khan Foundation's Reading to Learn programme. While the programmes differed in the recommended instructional approaches, there was an increasing consensus that educational quality was relatively low in early primary school in Kenya, but that there might be some useful potential solutions to the problem. The media was an important part of the process, and Uwezo played a significant role in ensuring that policy-makers heard the voices of the community regarding the necessity for education quality in Kenya.

Interventions

Kenya's policy-makers placed an increasing amount of pressure on the donors who were funding the assessments (such as USAID and Hewlett Foundation) to provide solutions to the educational quality problems rather than simply pointing out that such problems existed. As a result, USAID and the MoEST designed the Primary Math and Reading (PRIMR) Initiative, a 2011–2014 implementation and research programme to identify low-cost methods for improving the quality of early primary instruction. DFID/Kenya expanded the programme to additional locations, meaning that RTI International implemented PRIMR in seven counties. USAID, Hewlett Foundation and the Aga Khan Foundation designed the Reading to Learn intervention and incorporated Reading to Learn into the ongoing Education for Marginalized Children in Kenya (EMACK) interventions in Nairobi, Coast and Northeast provinces. Other programs were implemented to improve outcomes, including the Opportunity Schools programme led by the Women Educational Researchers of Kenya and SIL LEAD, the National Book Development Council of Kenya, several new DFID Girls' Education Challenge programmes, and the National Tablet Programme associated with the DFID-funded expansion of PRIMR. The combination of

these programmes has provided the MoEST with evidence that the problem of low achievement, identified by assessments such as EGRA, EGMA and Uwezo, has solutions.

What Next

The PRIMR Initiative showed that pupils who were in schools that had teachers' guides, teacher training, new pupil books and instructional support from the MoEST system were two to three times more likely to reach the MoEST benchmarks for literacy. The mathematics component of PRIMR showed modest gains in numeracy outcomes across the programme. Costs were low in PRIMR, with the pupil textbooks printed at less than 25 per cent of the book prices on the Kenyan market. The emphasis within PRIMR to work with and through the government system meant that the programme was both low cost and sustainable. As a result, the MoEST requested USAID and DFID to fund a national expansion of PRIMR, called Tusome (Let Us Read). At the same time, the MoEST's GPE grant has a significant focus on improving numeracy outcomes via the government systems and revised learning materials. These two programmes are not all; MoEST is also utilizing new training methods to support both pre-service teacher training at Kenya's primary teacher training colleges, supporting several additional DFID-funded Girls' Education Challenge programmes, and organizing in-service trainings on a yearly basis for numeracy and literacy. The MoEST is also designing a revised version of its own literacy and numeracy assessments to measure, over the next several years, whether this package of investments in the area of early literacy and numeracy is effective. Given the national scale of the Uwezo study, and its influence in the community, the MoEST is considering using a modified version of the Uwezo assessment to measure whether pupils have reached the expected competency levels in Kenya.

Malawi

Background

Malawi is a small, extremely poor, and relatively densely populated landlocked country in southeast Africa. With a gross national income per capita of US$270 per year, Malawi is one of the poorest countries in the world, and its gross domestic product is lower than that of other countries where a prolonged violent conflict has occurred, such as Rwanda and Sierra Leone (World Bank, 2014b). Given the economic trouble, it is not surprising that early grade literacy is quite low, too. In the 2011 SACMEQ assessment, Malawi tied Zambia for lowest mean reading score among countries assessed (The Southern and Eastern Africa Consortium for Monitoring Educational Quality, 2011). The 2010 national EGRA revealed that 95 per cent of students were unable to read a single word of connected text (see Figure 1 above).

Beginning in 1991, the Government of Malawi began abolishing primary education fees grade by grade but the policy was not fully enforced until September 1994, when all primary education was free (Avenstrup, Liang, & Nellemann, 2004). Though universal primary education is an important goal, free education has caused a ballooning of students in primary school classrooms, particularly in the early grades. The World Bank reported the percentage gross school enrolment in primary schools in Malawi as 141 per cent. Students repeating grades or entering school late contribute to the number exceeding full enrolment, but the number is increased further due to incomplete record-keeping on the number of children born in Malawi. Many births are not recorded, so more children than expected arrive at primary schools. In short, the classrooms are extremely overcrowded (World Bank, 2014b).

The large enrolment numbers have direct implications for teachers. They regularly have to manage very large classes. SACMEQ reported that the average ratio was 88 students per teacher in 2007, and was 97 students per teacher in rural areas (Milner, Muera D, & Chimuzu, 2011). Managing such large classes would be challenging even for the most skilled and experienced teachers, but in Malawi, the teacher training system is not very robust, and recently

efforts to increase the number of teachers with shorter term pre-service training have been implemented, albeit with minimal success (Milner et al., 2011).

Additionally, there is a dearth of materials available for students. In 2007, approximately 73 per cent of Malawian Standard 6 students had basic learning materials – defined as having at least one exercise book, pencil or pen, and ruler, as compared to an average of 79 per cent in other SACMEQ countries (The Southern and Eastern Africa Consortium for Monitoring Educational Quality, 2011). The challenge in delivering quality teaching and learning with these constraints is exacerbated by the fact that the standard school day is only three hours long.

Finally, the policy on language of instruction also impacts the ability of teachers to teach, and in some cases poor implementation of teacher assignment policies contributes to challenges in improving student learning. Classes are taught in English after Standard 4, and are to be taught in Chichewa, the officially designated national language, for Standards 1 to 4. Nonetheless, teachers are often assigned to locations where they may not be fully fluent in the local language, and while they can teach in Chichewa, they struggle to communicate easily in the students' native tongue. Additionally, some students may first be exposed to Chichewa in Standard 1, which inhibits their ability to learn. There is significant political sensitivity around the use of mother tongue as the language of instruction (though some are taught as subjects in school). And, the issue is further complicated in that some areas have multiple local languages, so determining which local language is appropriate for instruction at an individual school is a complicated challenge for Malawi to overcome as it strives to improve learning of all primary students.

The sum of these challenges is reflected in the extremely poor results from literacy assessments conducted in Malawi over the past decade. In response to these persistently low

outcomes, donors, including USAID, have been working with the Malawi Ministry of Education, Science and Technology (MoEST) to improve learner outcomes.

Process/Interventions

Through a USAID contract and in partnership with Creative Associates International Inc., and along with Seward, Inc., RTI International supported the Malawi Teacher Professional Development Support (MTPDS) project from 2010–2013. The project reached seven districts over the life of the project, beginning in two districts then scaling up to an additional five. MTPDS incorporated several result areas:

- Strengthening teacher policy, support, and management systems, and enhancing teacher performance,
- Improving early grade literacy,
- Improving the quality of teaching and learning materials, and
- Strengthening monitoring and evaluation (M&E) systems on teacher competencies and learner outcomes.

At the beginning of the MTPDS project, a National Literacy Forum was held. It was noted there that there had been several successful smaller projects which had not reached more than a few districts. Building upon best practices from earlier smaller programmes, MTPDS worked with the Malawi MoEST to train teachers in literacy teaching, and rolled out the 'Maziko a Kuwerenga' (MaK) (Foundations of Reading) programme, which covered skills such as phonemic awareness and alphabetic principle. The programme provided teachers with a teachers' guide and scripted lesson plans to accompany the Nditha Kuwerenga student readers which were distributed to students in Standard 1 in intervention districts (USAID, 2014). The intervention was rolled out initially in 238 schools in two districts in September of 2011, and was later

expanded to reach 1,310 schools in a total of seven districts. Training on the first and second modules of the MaK was provided to all Standard 1 teachers and head teachers in the first two intervention districts. Primary Education Advisors (PEAs) were trained in the five additional intervention districts to roll out the MaK module 1, and later in module 2 (Backman & Harvey, 2013). Module 3 was rolled out through the PEAs in 2012 (Pouezevara, Costello, & Banda, 2013). The project worked with the Malawi Institute for Education (MIE) to help develop the materials.

Building upon the continuous professional development (CPD) standards set by the MoEST, MTPDS also implemented a cascade CPD model which differed from the previous CPD model of central trainings, which was quite expensive. MTPDS delivered ongoing school-based coaching through the PEAs, and supported small fuel stipends (MWK 8,000) to enable the PEAs to reach the schools in their district. During these routine coaching visits, the PEAs would answer teacher questions, practise modelling lessons, and provide feedback to teachers. The project supported these ongoing visits by the PEAs to teachers in their districts, giving a small transport stipend to the PEAs to facilitate their travel.

Results

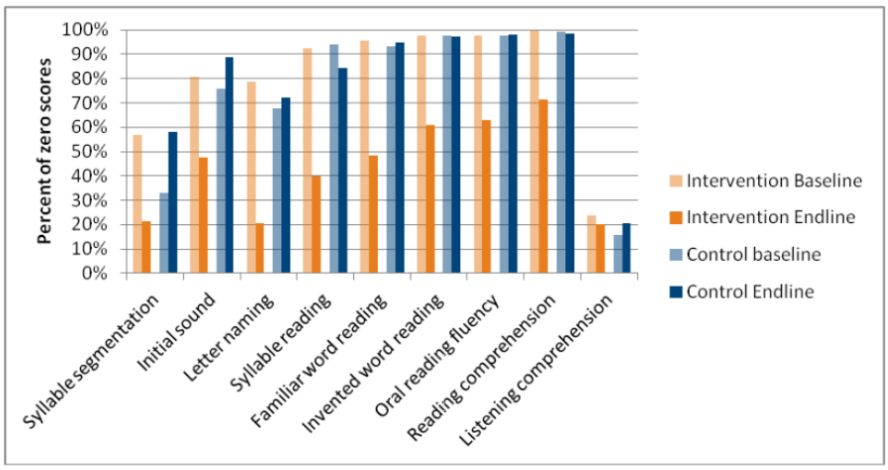
As part of MTPDS, baseline, midline and endline EGRAs were conducted. The results from the nationally representative sample in the 2010 baseline showed that reading skills were quite poor in Malawi. The average reading speed for a student in Standard 2 was one word per minute, and only reached eleven correct words per minute for students in Standard 4 (Backman & Harvey, 2013). The midline study in the two initial intervention districts and control districts showed that students in the intervention districts performed better than those assessed at the baseline in the same districts. As no other interventions were occurring in the two intervention

districts at the time, it is highly likely that the improvement was attributable to the MaK programme (Pouezevara et al., 2013).

Endline data were collected in the control and treatment groups and demonstrated improvement from the baseline, and showed that Maziko a Kuwerenga was improving student literacy among Standard 2 learners. The study was conducted among Standard 2 students to capture the literacy gains from Standard 1 interventions as students moved to the following grade. The results showed that students in the intervention districts demonstrated large absolute as well as relative gains in reading performance; however, overall reading performance was still quite low. In the endline study, the mean oral reading fluency in the treatment groups was 7.4 correct words per minute, as compared to 0.2 correct words per minute in the control group. Within the treatment group, both boys and girls had similar scores; the boys' oral reading fluency rate was 7.1 correct words per minute, while girls read 7.0 correct words per minute. The mean was impacted by the fact that approximately 63 per cent of students failed to read, so among the children who did read in the treatment schools, the mean oral reading fluency was 19.1 correct words per minute as compared to 8.0 correct words per minute for the same group in the control schools (Pouezevara et al., 2013).

The EGRA assessment tool includes a discontinue rule – that is, when a child fails to provide even a single correct answer to the first several items on a given subtask of the assessment, the subtask is stopped, and a zero score is recorded. In the endline assessment, intervention schools showed much better results. In Figure 5, a smaller bar reflects that fewer children showed no reading ability. For example, in the familiar word reading, nearly 95 per cent of students in the intervention school had a zero score for the subtask prior to MTPDS; after the intervention, slightly less than 50 per cent of the students had a zero score for the subtask (Pouezevara et al., 2013).

Figure 5. Malawi reading programme: EGRA zero scores at baseline and endline



What Next

MTPDS worked closely with the MoEST in many ways, including developing the assessment, training the assessors and jointly sharing the literacy results of the EGRAs. The MoEST agreed to benchmarks discussed after the 2010 baseline study, and noted that the benchmarks should be shared with stakeholders so as to institutionalize and publicize the standards, particularly for inclusion in a National Reading Strategy.

Although dissemination of these benchmarks is helpful, much of the momentum for improving literacy in Malawi is still driven by outside donors. Generally, USAID is focusing on improving teachers through CPD, and improving the quality and availability of teaching and learning materials, as well as incorporating a larger gender focus into its work. Building on of the success of MTPDS, RTI International is currently implementing the Malawi Early Grade Reading Activity, a 39-month USAID-funded project which began in June 2013. The project expands the intervention districts reached by MTPDS, touching approximately eleven

educational districts in Malawi. The Early Grade Reading Activity focuses on the development of teaching and student materials for Standards 1 to 3 as well as CPD for teachers in Standards 1 to 3 in teaching reading, including scripted lesson plans, consistent in-service teacher support and mentoring, and an in service practicum for teacher trainees. The project is collaborating closely with the MIE, which is providing input on the materials development. In addition, the project includes the development, production, and distribution of more literacy materials, including decodable and levelled books, story cards and chalk slates. Community engagement, particularly of parents to support student reading, is also included; as is improving the policy environment in Malawi to further improve early grade reading, such as extending the school day to incorporate reading instruction time.

As of July 2014, USAID was planning to develop a programme to improve education achievement for girls in upper primary, with a particular focus on literacy outcomes and completion, as well as improving sexual and health care seeking behaviours among youth ages 10 to 19 and addressing key structural and cultural barriers preventing girls' access to school. The aim is to address the significant dropout rates for girls, particularly in Standard 6, which leaves fewer girls in Standards 7 and 8 to proceed to secondary school. Additionally, the passing rate for the primary school leaving certificate for girls is a dismal 62 per cent, and it is estimated that fewer than one in three girls who start primary Standard 1 complete the primary cycle (Holkamp, 2009). Although the impact of these newer USAID projects remains to be seen, without grand policy changes, their success will be limited by the other challenges faced by primary school students in Malawi, including the extremely large class sizes, language-of-instruction issues and improved access for all students and teachers to appropriate teaching and learning materials.

Nicaragua

Background

In 2008 Nicaragua was immersed in the global economic crisis. It was the second poorest country in the Americas and the current Minister of Education had made it clear upon his arrival that his priority would be higher education (Mejía & Pouezevara, 2011). However, many in the Ministry had begun to realize the importance of early education. At the same time, USAID, under the Education Data for Decision Making (EdData II) project, put out a call to countries that would be interested in being among the first to assess the level of early literacy in order to begin a new focus on improving instruction. Nicaragua volunteered and became the first to implement a Spanish-language EGRA in late 2007 and early 2008. The scope of work was to have RTI adapt the EGRA into Spanish, then pilot and conduct national-level assessments (one in 2008 and another in 2010), thereby enabling the Ministry of Education (MINED) to better understand student reading performance in Grades 2 to 4 and how to make improvements. What followed was a demand-driven process of collaboration, ownership and support among USAID, RTI, MINED and two local organizations that helped move the Ministry from an emphasis on higher education to a focus that became known as the *Batalla por el Primer Grado* (Battle for the First Grade).

To begin this process RTI knew that it would be imperative to work closely with MINED and have a local organization implementing the data collection. This would allow the assessment to belong to Nicaragua and leave lasting capacity behind. After a competitive process a small women-owned non-governmental organization called *El Centro de Investigación y Acción Educativa Social* ([CIASES] Centre for Social Educational Investigation and Action) was chosen. With the help of CIASES, the EGRA was adapted, piloted and conducted in April 2008 (the beginning of the school year) so that by early 2009 CIASES and US technical experts could

present the results to MINED. The Ministry and CIASES had been involved in every step of the process, from writing stories for the assessment to coordinating logistics for data collection and fielding assessor teams.

Results

The EGRA sample, drawn from schools with a minimum enrolment of twenty students per grade in Grades 2 through 4, consisted of 6,649 students. Surveys were given to teachers and school directors with questions that would uncover the factors that affected education. Table 8 shows a summary of the results. Although the overall performance in Nicaragua far surpassed the mostly dismal result emerging from many sub-Saharan African countries, the Ministry leadership was quite disappointed with the results and pledged to immediately embark on an improvement programme. Average oral reading fluency scores for students with two years of schooling (those tested at the beginning of their third grade year) was 82.7 correct words per minute. The Head of Basic Education announced that there would be eight workshops conducted throughout the country to assist teachers in their efforts to improve student reading skills (RTI International, 2010).

Table 8. Nicaragua EGRA results, Grades 2–4, 2009

Measure	Grade	Mean	Standard Deviation
Letter naming (correct letters per minute)	2	39.4	18.5
	3	52.5	18.2
	4	62.5	17.6
Familiar words (correct words per minute)	2	34.8	20.6
	3	55.0	21.3
	4	68.0	21.0
Oral reading fluency (correct words per minute)	2	46.5	31.0
	3	82.7	33.9
	4	106.5	33.4

Measure	Grade	Mean	Standard Deviation
Reading comprehension (% correct of total possible)	2	56.8	39.1
	3	81.8	24.9
	4	86.9	17.9

USAID was persuaded by MINED that there was no need for a second assessment; instead, real action in the form of workshops to train teacher advisors and teachers was needed. Working side by side with CIASES, RTI's technical team developed a workshop that would teach teachers research-based best practices of reading instruction and how to use EGRA to make decisions about instruction. RTI experts and CIASES facilitated four workshops for teacher advisors from all parts of the country, including one workshop especially for the Atlantic Coast region (whose primary languages are Miskito, Rama, Sumu and English Creole rather than Spanish). A total of 180 people were trained. By facilitating the workshops, CIASES staff became near experts in the reading process and basic instructional techniques. This meant that a cohort of teacher advisors was now prepared and motivated to replicate the workshops for their teachers.

As part of the original scope of this project, RTI was tasked with producing a social marketing video to raise awareness of the importance of early grade reading skills. A second video would be made to demonstrate model research based on early grade reading instructional activities. Again a local organization was selected and became the catalyst for significant change in the private sector. Under the guidance of a US reading expert, CIASES and the video production firm Carlos Cuadra Productions scripted, filmed and produced two videos that supported MINED's new focus on the urgency of improving early reading in Nicaragua.

While filming these videos it became clear to Carlos Cuadra Productions that more could be done if the private sector were involved, though the project was coming to an end, and only the final media closing event remained. With MINED's permission to move forward, Carlos Cuadra, CIASES and RTI worked together to design an initial, two-part campaign and contest to improve early grade reading and launched it at the media event. The campaign was called *Todos a Leer* (Everyone Reads) and the media, non-governmental organizations and private sector began to pledge support immediately. The first part of the campaign raised donations to put books in schools. The second part was a contest in which teachers at the district, regional and national levels would receive awards for the greatest improvement in student reading. Educational prizes donated by the private sector were given at all levels. The campaign was successfully organized and implemented entirely by Nicaraguan organizations, spearheaded by CIASES and Carlos Cuadra (RTI International, 2010).

In 2010 the World Bank and USAID wanted to further the cause of improving early grade reading around the world. The First All Children Reading meeting was held in Washington, DC, organized by RTI. The idea was to bring several countries together with experts, non-governmental organizations and donors to support improving early reading. The Head of Basic Education from Nicaragua was invited. At the meeting he presented his country's plan for *El Batalla de Primer Grado* and walked away with considerable positive feedback; he returned to Nicaragua to oversee the improvement of reading instruction and use of assessments for this purpose.

At this time there was a growing interest in understanding the role mathematics played in the development of early learning. To complement the assessment of reading skills, the Ministry requested that the recently developed EGMA be adapted for use and applied in Nicaragua.

CIASES and RTI were called upon to pilot this new instrument. The pilot consisted of 1,817 students. Table 9 summarizes the results of the pilot (RTI International & CIASES, 2011).

Table 9. Nicaragua EGMA results, Grades 2–4, 2011

	Percentage of correct answers, by assessment subtask						
Grade	**Number identification**	**Quantity discrimination**	**Number patterns**	**Addition**	**Subtraction**	**Word problems**	**Geometry**
Grade 2	42.6	68.1	7.5	20.3	9.0	27.1	50.6
Grade 3	68.3	82.0	17.6	36.0	19.9	44.3	59.0
Grade 4	83.9	90.4	28.5	51.4	32.4	55.8	61.2
Total	**64.6**	**80.0**	**17.7**	**35.6**	**20.2**	**42.2**	**56.8**

All of this work and investment was moving Nicaragua closer to its goals of improving early grade education in Spanish, but with the additional other languages spoken in the Atlantic Coast region (see p. 60), the most under-resourced part of the country, MINED again asked for support from the World Bank. CIASES, with guidance from RTI, piloted the EGRA in three more languages. Around this time CIASES noted that the name of the instrument was difficult and had little meaning for most Spanish speakers. They worked with officials of MINED to rename the instrument *Examen de Lectura Inicial* (ELI, or Evaluation of Early Reading), which it remains called today.

The work that was accomplished in Nicaragua benefited the country in several ways. With a renewed focus on early grade education, primary school teachers and students received significant resources from MINED with the goal of having all Grade 1 children reading with comprehension by the end of the school year. One of the most notable results of the early reading activities was the shift in focus of MINED and the Minister to early grade education. This result can best be seen in the success of MINED's *Batalla por el Primer Grado*.

One of the most important outcomes of the activities was the knowledge and experience gained by the MINED employees. By participating in the adaptation of all the assessments, MINED evaluation experts gained the experience to continue adapting new versions of the assessments in the four languages and in new languages. MINED also insisted that all the teacher advisors who had been trained replicate the workshops for teachers throughout the country. Using the materials and videos, MINED replicated the workshops numerous times with its own training budget.

Along with this important shift in attention and resources, the capacity of the local stakeholders was expanded, and a social marketing campaign was put in place that continues to grow. The *Todos a Leer* campaign designed and implemented by Carlos Cuadra and CIASES grew from the launch in 2010 and continues to provide books and support to schools. The main goals of the campaign are to support all Grade 1 students' learning to read comprehensively at 35 words per minute, to increase the interest and participation of the public in helping to improve student outcomes and to elevate the profession of teachers. The creation and maintenance of this campaign has been entirely Nicaraguan and born of the need that was realized while implementing this project. It is one of the longest lasting results of the early grade reading activities.

Finally, an unexpected benefit of the project was the development of CIASES. Through its work with RTI and MINED, CIASES was able to expand both its technical capacity and its financial and business capacity. Although CIASES had prior expertise in assessment, by the end of this project the organization had gained significant knowledge and experience in EGRA, EGMA and reading instruction. RTI also supported CIASES through financial management mentorship and training. After the end of the initial project, CIASES continued to work on

USAID- and other donor-funded projects in Nicaragua as well as in Honduras, Ecuador and the Dominican Republic, where the organization supported digital data collection for the first time.

Next Steps

As of mid-2014, MINED was continuing to focus on improving education in primary grades. The Ministry began the *Batalla por el Sexto Grado* (Battle for the Sixth Grade). In 2013 MINED was still working with the *Todos a Leer* campaign and using the stories for reading passages in its national exams. Mathematics has had a slower start, and EGMA has not yet been implemented nationally, but there is hope it will be soon.

The *Todos a Leer* campaign continues to support schools' and teachers' raising money for books, reading clubs, reading corners in classrooms and literacy festivals, among other reading-focused activities. In 2013 the campaign reached 247 schools and 278 classrooms. That year 7,000 students participated in the contest, with 250 students from 35 municipalities attending the national-level competition. In 2014 the goal was to reach 300 schools and have 14,000 students participate in the contest (Castro Cardenal, 2014).

Philippines

Background

In 2012, the education sector in the Philippines had reached a critical juncture. Despite making continued progress towards achieving Education for All, concern was growing over the recent deterioration of quality and a persistent drop-out problem. The Department of Education (DepED) launched a complete restructuring of elementary and secondary education that included adding two years to the secondary cycle and overhauling the curricula for all subjects from kindergarten to Grade 12 (which became known as the K to 12 reform programme). One major area of curriculum reform involved introducing mother tongue-based, multilingual education (MTB-MLE) as an approach to improving student acquisition of literacy in the early grades of

elementary school. MTB-MLE was intended to both introduce maternal languages as media of instruction and provide a purposeful and progressive transition to the use of both Filipino and English as media of instruction. Students were therefore expected to acquire literacy skills in their mother tongue, and then transfer those skills to both Filipino and English as they increasingly were exposed to and learned those languages in Grades 2, 3 and 4.

The DepED has long emphasized on reading in elementary grades, as best evidenced by its Every Child a Reader Programme. In an effort to obtain better information on how well students were acquiring literacy in Filipino and English, DepED worked with USAID to implement the Philippines' first ever national, sample-based evaluation of reading skills in Grade 3 using the EGRA. Implementing the EGRA during the 2012–13 school year would allow the results to serve as a baseline of student performance prior to the full implementation of the K to 12 reforms and the introduction of MTB-MLE. This introduction was being piloted in some parts of the country, so the 2012–13 EGRA would also include an assessment of reading performance in one mother tongue (Ilokano) in Grade 1, in a set of what were known as 'pioneer schools', where Ilokano had been piloted as the language of instruction and the language of literacy.

Process

RTI International was contracted by USAID to support DepED in the development and implementation of both the national EGRA in Filipino and English, and the mother-tongue EGRA in one region. Working closely with curriculum and reading specialists from DepED and with linguists and other reading specialists from the Philippine academic community, they developed the instruments for assessment in all three languages. A local organization with vast survey experience, Taylor Nelson Sofres Global (TNS), was selected through a competitive process to also support the work. TNS provided the assessors who teamed with DepED staff to implement the assessment.

For the Filipino and English EGRA, a national sample of 2,410 students was randomly selected using a stratified, three-stage process. The sample was structured so as to allow disaggregation to six geographic areas of the Philippines: Northern Luzon, Metro Manila, South Luzon, Visayas, Mindanao and the Autonomous Region of Muslim Mindanao (ARMM). For the Ilokano EGRA, 500 students were selected using a stratified, two-stage process in the one region where Ilokano was the predominant mother tongue and where schools were piloting literacy instruction in that language.

Findings

Table 10 shows the results of the Grade 3 EGRA in Filipino and English. Girls outperformed boys on every subtask. Levels of oral reading fluency in both languages were reasonable (means of 68 and 67 correct words per minute [cwpm] for Filipino and English), reaching levels that are generally commensurate with being able to comprehend the text being read. However, comprehension in English

Table 10. Philippines EGRA results, Grade 3, 2013

Subtask		Mean	Percentage of zero scores	Boys	Girls
Letter sound identification (100 items - # correct per minute)	Filipino	21	10%	19	23
	English	22	6%	20	24
Familiar word reading (50 items - # correct per minute)	Filipino	54	1%	50	58
	English	51	2%	48	55
Nonword reading (50 items - # correct per minute)	Filipino	31	3%	28	34
	English	26	6%	24	29
Oral reading of text (57/59 items - # correct per minute)	Filipino	68	1%	60	77
	English	67	1%	60	75
Initial sound identification (10 items - % correct)	Filipino	65%	7%	62%	68%
	English	55%	17%	53%	57%
Reading comprehension (5 questions - % correct)	Filipino	73%	6%	69%	78%
	English	32%	37%	28%	37%
Listening comprehension (3 questions - % correct)	Filipino	66%	11%	63%	69%
	English	33%	45%	30%	37%

did surface as an area of concern, with students on average answering only 32 per cent of the comprehension questions correctly, compared to an average of 73 per cent correct in Filipino.

In addition to the differences between girls' and boys' performance, region and age were two other variables that impacted reading. Metro Manila had the highest performance in both English and Filipino, followed by South Luzon in Filipino and Visayas in English. ARMM, one of the more disadvantaged parts of the country, had the lowest scores in both languages.

A significant proportion of students in Grade 3 were overage (32 per cent self-reported as more than 9 years old). These students scored lower on fluency and comprehension in both languages. Overage boys in particular had the lowest fluency and comprehension in both Filipino and English.

The results for Grade 1 Ilokano in the schools where the MTB-MLE programme was being piloted showed that reading ability spanned a wide range – from zero to more than 60 cwpm. Nearly half the children were reading fewer than 10 cwpm on the oral reading passage, and the average score was 18 cwpm. As in the English and Filipino results, girls achieved higher average scores than boys across all subtasks. For students nearing the end of Grade 1 and working in their maternal language, comprehension was low. On average, students answered only 23 per cent of the reading comprehension questions and less than half the listening comprehension questions correctly. Since the introduction of mother tongue was fairly recent, a concern was whether children were entering Grade 1 to work in Ilokano after having attending a kindergarten the previous year that provided instruction in Filipino or English. Further study of the acquisition of reading skills in mother tongue was recently undertaken in 2014 to try to more fully understand both teaching and learning.

Results

Following completion of the Filipino, English and Ilokano EGRAs, a workshop on EGRA results was organized by DepED with support from RTI, SEAMEO-INNOTECH and TNS. Fifty-two participants gathered to discuss the findings from the EGRAs. Some of the findings from that workshop included the following.

- There is a need to target and improve instruction in the reading building blocks, including oral language development, phonological awareness, phonemic awareness, vocabulary and comprehension.
- Oral reading fluency by itself does not guarantee comprehension. Therefore greater emphasis is needed on the teaching of specific comprehension skills.
- The curriculum for kindergarten must be aligned to the content and expectations of MTB-MLE.
- Students who do not speak the mother tongue being used as the medium of instruction may encounter difficulty. Introduction of additional mother tongues may help address this.
- There is also a need for specific strategies to better address the learning needs of overage students – in particular overage boys. And more information is needed to understand what is causing students to be overage – late start, irregular attendance, exit and re-entry, etc.

DepED in the Philippines has demonstrated its commitment to assessing reading in the early grades of elementary school, having gone on to develop instruments in twelve mother tongues, with the goal of having instruments in the seventeen languages being introduced under the MTB-MLE policy. In 2014, USAID, RTI and TNS assisted DepED in carrying out another EGRA in Grades 1 and 2 in four mother tongues in four regions.

Next Steps

DepED is committed to using EGRA both at the system level to measure performance and as a tool that teachers can use to continuously monitor student progress at the classroom level. The results of the 2013 and 2014 surveys provided baselines against which DepED can evaluate the impact of the implementation of the K to 12 reforms and MTB-MLE on student acquisition of literacy in the four most widely spoken mother tongues, in Filipino and in English. Additional baseline surveys may be conducted in 2015 in other languages and regions. The 2014 EGRA included data collection at the school level that provided insight into the implementation of MTB-MLE in the four regions/languages included in the study. DepED is working to put in place all the supports necessary to enable teachers to effectively provide reading instruction in mother tongues, but additional professional development will most likely be needed. Encouragingly, in the four regions studied this year, all classrooms were consistently using the regional mother tongues as media of instruction for literacy/language classes and for other subjects.

Conclusions

As the above has endeavoured to show, the motivation and underlying purpose of the early learning assessment tools has been to provide timely access to data to inform decision making for learning improvement in low-income countries. The data have alerted several governments, leading to improvements in teacher training and support, revision of teaching and learning materials and increased support for mother tongue instruction, in several cases at national scale. As the case study experiences illustrate, government participation from assessment inception to completion has an important effect on how governments react to the results; those governments which have been highly involved in the process tend to respond more constructively to the news of need for improvement. Of course the rule has its exceptions; in

some cases despite intense collaborative efforts, the reaction to the results was mixed, with little follow-up from the government. Ensuring that assessment for learning improvement becomes embedded in education systems is a complex issue; outrage about poor results and subsequent motivation to improve is not always assured.

The assessments also sought to fill a gap for low-income countries that were, for whatever reason, reluctant to participate in the ILSAs. As noted by Wagner, the need for 'smaller, quicker, cheaper' assessments to work in complement to the ILSAs was evident (2003; Wagner, 2011). The relatively small sample sizes for EGRA and EGMA (ten students per grade in each of fifty schools for a national-level sample) helped to bring down costs, while free and readily available access to the tools meant that anyone (government, NGO or even a school) could conduct the assessment at any time, without having to wait for the next ILSA assessment period to come around. To date, more than 160 known applications of EGRA have been completed, many of which have not been centrally compiled or collected. For the ASER and Uwezo assessments, the combined effect of community mobilization and large-scale data collection has been extremely powerful in each country where the assessments have transpired.

Another reason for the possible take-up of the assessments is the relatively low-risk nature of participation. Few low-income countries were willing to risk the stigma and loss of political capital stemming from appearing at the bottom of the ILSA league tables of participating (mostly wealthy) countries. Several countries, including South Africa and Indonesia, have at one point or another, suspended national participation in the ILSAs for precisely that reason. To date, results reporting of EGRA and EMGA has endeavoured to avoid the league tables that have somewhat unfortunately come to characterize other assessment approaches. With the early learning assessments, governments can, and in several cases have

been able to, conduct the assessments without having to publish the results (or informing anyone that an assessment had been conducted).

Those characteristics that have made the assessments attractive to low-income country governments, including the lack of rigorous comparability between languages and the absence of aggregated global reports with long league tables, may well cause them to be overlooked as possible measures that could contribute to a set of new learning targets in the post-2015 goals. But for countries that have the farthest to go in terms of meeting learning goals, participation in a relatively low-risk assessment, like EGRA, may well be a good entry point. If the goal is to have all countries measure, report on and improve learning, complete standardization across all countries, contexts and languages may well be both undesirable and ill-advised. If the global community can agree to some flexibility in how learning is measured, but with standardization in reporting and transparency of measurement, there may be a greater chance that more countries will monitor learning for improvement.

How would this actually work? One proposed approach would be to create goals and indicators that ask countries to monitor progress for a given population; for example, to 'reduce by half the proportion of non-readers by the end of Grade 3'. With a broad goal like this, countries could conduct assessments in any number of ways, but the samples would have to be nationally representative, with results disaggregated by gender and possibly key marginalized groups, and both a denominator (number of students enrolled at the end of Grade 3) and a numerator (number of students who cannot read) would have to be reported (and the ratio between the two monitored over time). A second approach that would allow greater measurement of progress, particularly in those countries with very low performance, would be to use the results to generate reading profiles drawn from the progression of reading development and track the share of children in each group, e.g. monitoring the percentage of students in each

of the following skill levels: pre-reading, emergent, proficient. How countries define 'reading' or allocate students to a particular profile could be entirely up to the local authorities and their stakeholders. But reports and approaches, including detailed definitions of the reading profiles or what it means to be a 'reader', would need to be publicly available and auditable, so that countries could own up to their methods (and countries needing additional support could be identified).

Likely this approach would make the statisticians of the World Bank and the UNESCO Institute for Statistics (UIS) quite nervous. But in truth, this concept is not that distant from where we were with respect to enrolment and completion data in 1990. The enrolment data compiled on an annual basis from forms sent out by UNESCO were less than perfect, but the data have improved over time and with it so has the motivation for most governments to do a better job in reporting and accounting for progress (Chabbott, 2014). While the critiques of UIS are well-known (Cusso, 2006), global agreement on the importance of enrolment and completion metrics, even imperfectly measured, helped to motivate countries to monitor progress towards achieving education for all.

With a flexible learning goal and clear and measureable indicators, accompanied by measurement guidance and support for the establishment of effective assessment systems, surely we will be able to advance the practice and methods for learning measurement within the next ten years, perhaps even more quickly than what it took to get improved metrics on primary enrolment and completion.

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Appendix 1. Percentage of students scoring zero on EGRA subtasks, by country, year, language, grade

Country	Year	Language	Grade	EGRA subtask	Proportion of students scoring zero	95% confidence interval	Number of students in sample
Ghana	2013	Akuapem	Grade 2	Invented Words	76.4%	(70.5%, 82.4%)	689
Ghana	2013	Akuapem	Grade 2	Listening Comprehension	23.8%	(19.3%, 28.3%)	689
Ghana	2013	Akuapem	Grade 2	Oral Reading Fluency	64.6%	(57%, 72.2%)	689
Ghana	2013	Akuapem	Grade 2	Reading Comprehension	89.7%	(85.5%, 93.9%)	689
Ghana	2013	Asanti	Grade 2	Invented Words	86.9%	(83.2%, 90.6%)	1633
Ghana	2013	Asanti	Grade 2	Listening Comprehension	25.8%	(22%, 29.5%)	1634
Ghana	2013	Asanti	Grade 2	Oral Reading Fluency	82.7%	(78.6%, 86.8%)	1634
Ghana	2013	Asanti	Grade 2	Reading Comprehension	92.8%	(90.1%, 95.4%)	1634
Ghana	2013	Dagaare	Grade 2	Invented Words	91.5%	(86.1%, 96.8%)	541
Ghana	2013	Dagaare	Grade 2	Listening Comprehension	39.7%	(29%, 50.4%)	541
Ghana	2013	Dagaare	Grade 2	Oral Reading Fluency	85.9%	(79%, 92.7%)	541
Ghana	2013	Dagaare	Grade 2	Reading Comprehension	94.3%	(90%, 98.6%)	541
Ghana	2013	Dagbani	Grade 2	Invented Words	90.0%	(86.1%, 93.9%)	432
Ghana	2013	Dagbani	Grade 2	Listening Comprehension	35.3%	(24.8%, 45.8%)	432
Ghana	2013	Dagbani	Grade 2	Oral Reading Fluency	87.4%	(81.9%, 92.9%)	432

Country	Year	Language	Grade	EGRA subtask	Proportion of students scoring zero	95% confidence interval	Number of students in sample
Ghana	2013	Dagbani	Grade 2	Reading Comprehension	95.2%	(92.6%, 97.7%)	432
Ghana	2013	Dangme	Grade 2	Invented Words	73.6%	(66.2%, 80.9%)	447
Ghana	2013	Dangme	Grade 2	Listening Comprehension	11.6%	(8.3%, 15%)	447
Ghana	2013	Dangme	Grade 2	Oral Reading Fluency	58.1%	(48%, 68.2%)	447
Ghana	2013	Dangme	Grade 2	Reading Comprehension	72.1%	(62.6%, 81.6%)	447
Ghana	2013	Ewe	Grade 2	Invented Words	70.0%	(61.8%, 78.1%)	492
Ghana	2013	Ewe	Grade 2	Listening Comprehension	10.3%	(5.2%, 15.3%)	492
Ghana	2013	Ewe	Grade 2	Oral Reading Fluency	67.5%	(58.9%, 76.1%)	492
Ghana	2013	Ewe	Grade 2	Reading Comprehension	78.3%	(71.1%, 85.4%)	492
Ghana	2013	Fante	Grade 2	Invented Words	76.3%	(71.6%, 81%)	692
Ghana	2013	Fante	Grade 2	Listening Comprehension	9.0%	(6.6%, 11.4%)	692
Ghana	2013	Fante	Grade 2	Oral Reading Fluency	81.1%	(76%, 86.3%)	692
Ghana	2013	Fante	Grade 2	Reading Comprehension	92.7%	(89.2%, 96.2%)	692
Ghana	2013	Ga	Grade 2	Invented Words	68.6%	(61%, 76.3%)	430
Ghana	2013	Ga	Grade 2	Listening Comprehension	48.0%	(38.4%, 57.6%)	430
Ghana	2013	Ga	Grade 2	Oral Reading Fluency	67.2%	(58.7%, 75.8%)	430
Ghana	2013	Ga	Grade 2	Reading Comprehension	91.4%	(87%, 95.7%)	430

Country	Year	Language	Grade	EGRA subtask	Proportion of students scoring zero	95% confidence interval	Number of students in sample
Ghana	2013	Gonja	Grade 2	Invented Words	76.8%	(70%, 83.7%)	423
Ghana	2013	Gonja	Grade 2	Listening Comprehension	37.2%	(27.3%, 47.1%)	424
Ghana	2013	Gonja	Grade 2	Oral Reading Fluency	76.6%	(69.6%, 83.6%)	423
Ghana	2013	Gonja	Grade 2	Reading Comprehension	89.9%	(84.9%, 94.9%)	424
Ghana	2013	Kasem	Grade 2	Invented Words	95.4%	(93.1%, 97.7%)	439
Ghana	2013	Kasem	Grade 2	Listening Comprehension	38.4%	(29.5%, 47.4%)	439
Ghana	2013	Kasem	Grade 2	Oral Reading Fluency	91.5%	(88.3%, 94.6%)	439
Ghana	2013	Kasem	Grade 2	Reading Comprehension	95.4%	(92.9%, 97.8%)	439
Ghana	2013	Nzema	Grade 2	Invented Words	71.4%	(66.1%, 76.8%)	442
Ghana	2013	Nzema	Grade 2	Listening Comprehension	5.2%	(2.9%, 7.5%)	442
Ghana	2013	Nzema	Grade 2	Oral Reading Fluency	82.7%	(78.3%, 87.1%)	442
Ghana	2013	Nzema	Grade 2	Reading Comprehension	94.1%	(91.8%, 96.4%)	442
Iraq	2012	Arabic	Grade 2	Invented Words	52.0%	(44.9%, 59%)	580
Iraq	2012	Arabic	Grade 2	Letters Naming	23.4%	(16.1%, 30.6%)	580
Iraq	2012	Arabic	Grade 2	Listening Comprehension	13.9%	(8.8%, 18.9%)	562
Iraq	2012	Arabic	Grade 2	Oral Reading Fluency	34.2%	(26.5%, 41.9%)	580
Iraq	2012	Arabic	Grade 2	Reading Comprehension	55.1%	(46.4%, 63.9%)	504

Country	Year	Language	Grade	EGRA subtask	Proportion of students scoring zero	95% confidence interval	Number of students in sample
Iraq	2012	Arabic	Grade 3	Invented Words	38.9%	(32.6%, 45.2%)	573
Iraq	2012	Arabic	Grade 3	Letters Naming	24.8%	(17.2%, 32.4%)	573
Iraq	2012	Arabic	Grade 3	Listening Comprehension	10.5%	(6.7%, 14.2%)	569
Iraq	2012	Arabic	Grade 3	Oral Reading Fluency	17.5%	(9.9%, 25.1%)	573
Iraq	2012	Arabic	Grade 3	Reading Comprehension	29.2%	(19.9%, 38.5%)	541
Jordan	2012	Arabic	Grade 2	Invented Words	48.8%	(44.4%, 53.2%)	1528
Jordan	2012	Arabic	Grade 2	Listening Comprehension	15.4%	(12.4%, 18.3%)	1345
Jordan	2012	Arabic	Grade 2	Oral Reading Fluency	20.8%	(15.6%, 25.9%)	1514
Jordan	2012	Arabic	Grade 2	Reading Comprehension	26.8%	(21.9%, 31.8%)	1406
Jordan	2012	Arabic	Grade 3	Invented Words	45.4%	(40.4%, 50.3%)	1533
Jordan	2012	Arabic	Grade 3	Listening Comprehension	8.2%	(6.3%, 10%)	1474
Jordan	2012	Arabic	Grade 3	Oral Reading Fluency	19.7%	(14.9%, 24.4%)	1532
Jordan	2012	Arabic	Grade 3	Reading Comprehension	21.9%	(17.2%, 26.7%)	1489
Malawi	2010	Chichewa	Grade 2	Familiar Words	92.3%	(89.2%, 95.4%)	1957
Malawi	2010	Chichewa	Grade 2	Invented Words	95.0%	(92.4%, 97.7%)	1973
Malawi	2010	Chichewa	Grade 2	Letters Naming	80.1%	(74.6%, 85.7%)	1970
Malawi	2010	Chichewa	Grade 2	Listening Comprehension	18.3%	(12.3%, 24.3%)	1973

Country	Year	Language	Grade	EGRA subtask	Proportion of students scoring zero	95% confidence interval	Number of students in sample
Malawi	2010	Chichewa	Grade 2	Oral Reading Fluency	94.5%	(91.6%, 97.4%)	1973
Malawi	2010	Chichewa	Grade 2	Reading Comprehension	97.7%	(95.5%, 99.9%)	1969
Malawi	2010	Chichewa	Grade 4	Familiar Words	43.5%	(35.9%, 51.1%)	481
Malawi	2010	Chichewa	Grade 4	Invented Words	50.9%	(43.7%, 58.1%)	479
Malawi	2010	Chichewa	Grade 4	Letters Naming	25.0%	(19.6%, 30.4%)	480
Malawi	2010	Chichewa	Grade 4	Listening Comprehension	2.9%	(1.1%, 4.7%)	480
Malawi	2010	Chichewa	Grade 4	Oral Reading Fluency	54.7%	(47.1%, 62.3%)	480
Malawi	2010	Chichewa	Grade 4	Reading Comprehension	73.6%	(66.1%, 81%)	465
Malawi	2011	Chichewa	Grade 2	Familiar Words	89.3%	(86.9%, 91.6%)	1524
Malawi	2011	Chichewa	Grade 2	Invented Words	95.4%	(94.1%, 96.7%)	1524
Malawi	2011	Chichewa	Grade 2	Letters Naming	61.4%	(57.4%, 65.3%)	1526
Malawi	2011	Chichewa	Grade 2	Listening Comprehension	4.8%	(3.3%, 6.2%)	1525
Malawi	2011	Chichewa	Grade 2	Oral Reading Fluency	95.6%	(94.3%, 97%)	1525
Malawi	2011	Chichewa	Grade 2	Reading Comprehension	98.4%	(97.6%, 99.1%)	1492
Malawi	2011	Chichewa	Grade 4	Familiar Words	29.9%	(26.5%, 33.4%)	1493
Malawi	2011	Chichewa	Grade 4	Invented Words	47.2%	(43.6%, 50.7%)	1493
Malawi	2011	Chichewa	Grade 4	Letters Naming	14.7%	(12.2%, 17.2%)	1493

Country	Year	Language	Grade	EGRA subtask	Proportion of students scoring zero	95% confidence interval	Number of students in sample
Malawi	2011	Chichewa	Grade 4	Listening Comprehension	0.8%	(0.3%, 1.4%)	1491
Malawi	2011	Chichewa	Grade 4	Oral Reading Fluency	44.7%	(41.1%, 48.4%)	1487
Malawi	2011	Chichewa	Grade 4	Reading Comprehension	54.2%	(50.3%, 58%)	1455
Malawi	2012	Chichewa	Grade 2	Familiar Words	81.4%	(77.2%, 85.5%)	3364
Malawi	2012	Chichewa	Grade 2	Invented Words	87.7%	(83.2%, 92.3%)	3361
Malawi	2012	Chichewa	Grade 2	Letters Naming	49.5%	(45.2%, 53.8%)	3377
Malawi	2012	Chichewa	Grade 2	Listening Comprehension	30.7%	(26.7%, 34.6%)	3357
Malawi	2012	Chichewa	Grade 2	Oral Reading Fluency	90.2%	(86.7%, 93.7%)	3360
Malawi	2012	Chichewa	Grade 2	Reading Comprehension	94.4%	(92%, 96.8%)	3360
Malawi	2012	Chichewa	Grade 4	Familiar Words	28.9%	(21.4%, 36.3%)	1842
Malawi	2012	Chichewa	Grade 4	Invented Words	34.3%	(27.9%, 40.6%)	1841
Malawi	2012	Chichewa	Grade 4	Letters Naming	11.5%	(8.9%, 14.1%)	1848
Malawi	2012	Chichewa	Grade 4	Listening Comprehension	9.2%	(6.8%, 11.7%)	1837
Malawi	2012	Chichewa	Grade 4	Oral Reading Fluency	39.1%	(32.6%, 45.5%)	1839
Malawi	2012	Chichewa	Grade 4	Reading Comprehension	50.5%	(44.2%, 56.8%)	1839
Nepal	2014	Nepali	Grade 2	Invented Words	34.3%	(29%, 39.7%)	2570
Nepal	2014	Nepali	Grade 2	Listening Comprehension	11.3%	(7.7%, 14.8%)	2345

Country	Year	Language	Grade	EGRA subtask	Proportion of students scoring zero	95% confidence interval	Number of students in sample
Nepal	2014	Nepali	Grade 2	Oral Reading Fluency	36.9%	(30.7%, 43.1%)	2570
Nepal	2014	Nepali	Grade 2	Reading Comprehension	49.9%	(43.2%, 56.6%)	2545
Nepal	2014	Nepali	Grade 3	Invented Words	18.9%	(15%, 22.8%)	2513
Nepal	2014	Nepali	Grade 3	Listening Comprehension	6.4%	(4.1%, 8.6%)	2413
Nepal	2014	Nepali	Grade 3	Oral Reading Fluency	18.9%	(15.4%, 22.5%)	2513
Nepal	2014	Nepali	Grade 3	Reading Comprehension	27.2%	(22.6%, 31.9%)	2499
Nicaragua	2008	Spanish	Grade 2	Familiar Words	4.4%	(2.7%, 6%)	2162
Nicaragua	2008	Spanish	Grade 2	Invented Words	8.4%	(5.8%, 11%)	2161
Nicaragua	2008	Spanish	Grade 2	Letters Naming	2.2%	(1.1%, 3.3%)	2164
Nicaragua	2008	Spanish	Grade 2	Listening Comprehension	9.4%	(8%, 10.7%)	2164
Nicaragua	2008	Spanish	Grade 2	Oral Reading Fluency	6.4%	(3.9%, 9%)	2164
Nicaragua	2008	Spanish	Grade 2	Reading Comprehension	24.8%	(20.8%, 28.8%)	2164
Nicaragua	2008	Spanish	Grade 3	Familiar Words	0.7%	(0.2%, 1.2%)	2218
Nicaragua	2008	Spanish	Grade 3	Invented Words	1.8%	(1%, 2.6%)	2218
Nicaragua	2008	Spanish	Grade 3	Letters Naming	0.3%	(0.1%, 0.6%)	2216
Nicaragua	2008	Spanish	Grade 3	Listening Comprehension	9.9%	(8%, 11.8%)	2218
Nicaragua	2008	Spanish	Grade 3	Oral Reading Fluency	0.9%	(0.4%, 1.5%)	2218

Country	Year	Language	Grade	EGRA subtask	Proportion of students scoring zero	95% confidence interval	Number of students in sample
Nicaragua	2008	Spanish	Grade 3	Reading Comprehension	4.4%	(3.1%, 5.7%)	2218
Nicaragua	2008	Spanish	Grade 4	Familiar Words	0.0%	(0%, 0.1%)	2267
Nicaragua	2008	Spanish	Grade 4	Invented Words	0.3%	(0.1%, 0.6%)	2267
Nicaragua	2008	Spanish	Grade 4	Letters Naming	0.2%	(0%, 0.4%)	2265
Nicaragua	2008	Spanish	Grade 4	Listening Comprehension	8.3%	(6.6%, 10%)	2267
Nicaragua	2008	Spanish	Grade 4	Oral Reading Fluency	0.1%	(0%, 0.1%)	2267
Nicaragua	2008	Spanish	Grade 4	Reading Comprehension	0.7%	(0.1%, 1.3%)	2267
Rwanda	2011	English	Grade 4	Listening Comprehension	75.1%	(65%, 85.2%)	414
Rwanda	2011	English	Grade 6	Familiar Words	1.8%	(-0.9%, 4.5%)	420
Rwanda	2011	English	Grade 6	Invented Words	7.9%	(2.9%, 12.8%)	420
Rwanda	2011	English	Grade 6	Listening Comprehension	49.1%	(38.9%, 59.3%)	418
Rwanda	2011	English	Grade 6	Oral Reading Fluency	2.4%	(-0.8%, 5.6%)	420
Rwanda	2011	English	Grade 6	Reading Comprehension	61.7%	(49.8%, 73.6%)	418
Senegal	2009	French	Grade 3	Invented Words	2.2%	(0.2%, 4.2%)	520
Senegal	2009	French	Grade 3	Letters Naming	0.0%	(0%, 0%)	683
Senegal	2009	French	Grade 3	Oral Reading Fluency	4.4%	(0.4%, 8.4%)	588
Senegal	2009	French	Grade 3	Reading Comprehension	51.0%	(40.3%, 61.6%)	581

Country	Year	Language	Grade	EGRA subtask	Proportion of students scoring zero	95% confidence interval	Number of students in sample
Tanzania	2013	Kiswahili	Grade 2	Familiar Words	23.5%	(15.2%, 31.7%)	2266
Tanzania	2013	Kiswahili	Grade 2	Invented Words	28.0%	(20.7%, 35.3%)	2266
Tanzania	2013	Kiswahili	Grade 2	Listening Comprehension	3.4%	(0.6%, 6.1%)	2253
Tanzania	2013	Kiswahili	Grade 2	Oral Reading Fluency	27.7%	(20.1%, 35.3%)	2266
Tanzania	2013	Kiswahili	Grade 2	Reading Comprehension	40.3%	(32.3%, 48.3%)	2152

Appendix 2. National student EGMA subtask estimates, by country, year, language, grade

Country	Year	Language	Grade	Subtask	Subtask score (words per minute)	Number of students in sample	95% confidence interval lower bound
Rwanda	2011	English	Grade 4	Correct Numbers Identified	18.9	420	(16.8%, 21.1%)
Rwanda	2011	English	Grade 4	Correct Addition Problems	10.7	420	(9.3%, 12.1%)
Rwanda	2011	English	Grade 4	Correct Subtraction Problems	7.9	420	(6.7%, 9%)
Rwanda	2011	English	Grade 6	Correct Subtraction Problems	15.6	419	(14.1%, 17%)
Rwanda	2011	English	Grade 6	Correct Numbers Identified	10.8	420	(9.6%, 12%)
Rwanda	2011	English	Grade 6	Correct Addition Problems	19.1	420	(17.4%, 20.8%)
Iraq	2012	Arabic	Grade 2	Quantitative Comparison Problems	7.6	578	(6.9%, 8.2%)
Iraq	2012	Arabic	Grade 2	Correct Missing Numbers	3.1	578	(2.9%, 3.4%)
Iraq	2012	Arabic	Grade 2	Correct Missing Numbers	3.1	578	(2.9%, 3.4%)
Iraq	2012	Arabic	Grade 2	Correct Numbers Identified	28.1	579	(26.6%, 29.5%)
Jordan	2012	Arabic	Grade 2	Correct Numbers Identified	32.1	1485	(30.9%, 33.3%)
Jordan	2012	Arabic	Grade 2	Quantitative Comparison Problems	8.7	1518	(8.2%, 9.1%)
Jordan	2012	Arabic	Grade 2	Correct Missing Numbers	4.8	1527	(4.5%, 5%)
Jordan	2012	Arabic	Grade 2	Correct Missing Numbers	4.8	1527	(4.5%, 5%)
Jordan	2012	Arabic	Grade 3	Correct Numbers Identified	35.2	570	(33.3%, 37.1%)
Jordan	2012	Arabic	Grade 3	Quantitative Comparison Problems	9.5	571	(8.7%, 10.2%)
Jordan	2012	Arabic	Grade 3	Correct Missing Numbers	4.1	572	(3.7%, 4.4%)
Jordan	2012	Arabic	Grade 3	Correct Missing Numbers	4.1	572	(3.7%, 4.4%)
Jordan	2012	Arabic	Grade 3	Correct Numbers Identified	37.8	1499	(36.4%, 39.3%)
Jordan	2012	Arabic	Grade 3	Quantitative Comparison	10.6	1521	(10%, 11.2%)

Country	Year	Language	Grade	Subtask	Subtask score (words per minute)	Number of students in sample	95% confidence interval lower bound
				Problems			
Jordan	2012	Arabic	Grade 3	Correct Missing Numbers	6.0	1532	(5.6%, 6.4%)
Jordan	2012	Arabic	Grade 3	Correct Missing Numbers	6.0	1532	(5.6%, 6.4%)
Ghana	2013	Akuapem	Grade 2	Correct Numbers Identified	19.3	689	(18.1%, 20.4%)
Ghana	2013	Akuapem	Grade 2	Correct Addition Problems	9.2	689	(8.6%, 9.7%)
Ghana	2013	Akuapem	Grade 2	Correct Subtraction Problems	6.0	689	(5.5%, 6.6%)
Ghana	2013	Asanti	Grade 2	Correct Numbers Identified	18.2	1634	(17.4%, 19.1%)
Ghana	2013	Asanti	Grade 2	Correct Addition Problems	8.7	1634	(8.3%, 9.2%)
Ghana	2013	Asanti	Grade 2	Correct Subtraction Problems	6.3	1634	(5.8%, 6.8%)
Ghana	2013	Dagaare	Grade 2	Correct Numbers Identified	17.9	540	(16.2%, 19.5%)
Ghana	2013	Dagaare	Grade 2	Correct Addition Problems	9.4	541	(8.2%, 10.6%)
Ghana	2013	Dagaare	Grade 2	Correct Subtraction Problems	6.3	541	(5.3%, 7.3%)
Ghana	2013	Dagbani	Grade 2	Correct Numbers Identified	15.0	443	(13%, 17%)
Ghana	2013	Dagbani	Grade 2	Correct Addition Problems	7.3	443	(6.6%, 8.1%)
Ghana	2013	Dagbani	Grade 2	Correct Subtraction Problems	4.6	443	(3.9%, 5.3%)
Ghana	2013	Dangme	Grade 2	Correct Numbers Identified	19.7	447	(18.6%, 20.9%)
Ghana	2013	Dangme	Grade 2	Correct Addition Problems	9.8	447	(9%, 10.7%)
Ghana	2013	Dangme	Grade 2	Correct Subtraction Problems	6.9	447	(6.2%, 7.6%)
Ghana	2013	English	Grade 2	Correct Numbers Identified	16.3	1230	(15.4%, 17.2%)
Ghana	2013	English	Grade 2	Correct Addition Problems	8.1	1230	(7.5%, 8.7%)
Ghana	2013	English	Grade 2	Correct Subtraction Problems	4.8	1230	(4.3%, 5.2%)
Ghana	2013	Ewe	Grade 2	Correct Numbers Identified	18.9	502	(17.4%, 20.3%)
Ghana	2013	Ewe	Grade 2	Correct Addition Problems	9.8	502	(8.9%, 10.7%)
Ghana	2013	Ewe	Grade 2	Correct Subtraction Problems	7.5	502	(6.5%, 8.5%)

Country	Year	Language	Grade	Subtask	Subtask score (words per minute)	Number of students in sample	95% confidence interval lower bound
Ghana	2013	Fante	Grade 2	Correct Numbers Identified	19.9	692	(19.1%, 20.8%)
Ghana	2013	Fante	Grade 2	Correct Addition Problems	9.3	692	(8.8%, 9.8%)
Ghana	2013	Fante	Grade 2	Correct Subtraction Problems	6.7	692	(6.2%, 7.3%)
Ghana	2013	Ga	Grade 2	Correct Numbers Identified	22.7	430	(21.1%, 24.4%)
Ghana	2013	Ga	Grade 2	Correct Addition Problems	9.9	430	(9.1%, 10.8%)
Ghana	2013	Ga	Grade 2	Correct Subtraction Problems	6.9	430	(6%, 7.8%)
Ghana	2013	Gonja	Grade 2	Correct Numbers Identified	17.5	424	(15.9%, 19.2%)
Ghana	2013	Gonja	Grade 2	Correct Addition Problems	9.1	424	(8.1%, 10%)
Ghana	2013	Gonja	Grade 2	Correct Subtraction Problems	6.0	424	(5.1%, 6.8%)
Ghana	2013	Kasem	Grade 2	Correct Numbers Identified	15.7	449	(14.7%, 16.7%)
Ghana	2013	Kasem	Grade 2	Correct Addition Problems	8.4	449	(7.8%, 9%)
Ghana	2013	Kasem	Grade 2	Correct Subtraction Problems	4.6	449	(4.1%, 5.2%)
Ghana	2013	Kiswahili	Grade 2	Correct Addition Problems	7.6	2266	(6.7%, 8.4%)
Ghana	2013	Kiswahili	Grade 2	Correct Subtraction Problems	5.5	2266	(4.8%, 6.2%)
Ghana	2013	Nzema	Grade 2	Correct Numbers Identified	20.2	442	(19%, 21.3%)
Ghana	2013	Nzema	Grade 2	Correct Addition Problems	9.9	442	(9.4%, 10.4%)
Ghana	2013	Nzema	Grade 2	Correct Subtraction Problems	7.4	442	(6.9%, 7.9%)

Appendix 3. Distribution of oral reading fluency scores, by year, country, language, grade

Table 3-1: Distribution of oral reading fluency scores for Grade 2, 2013, by language

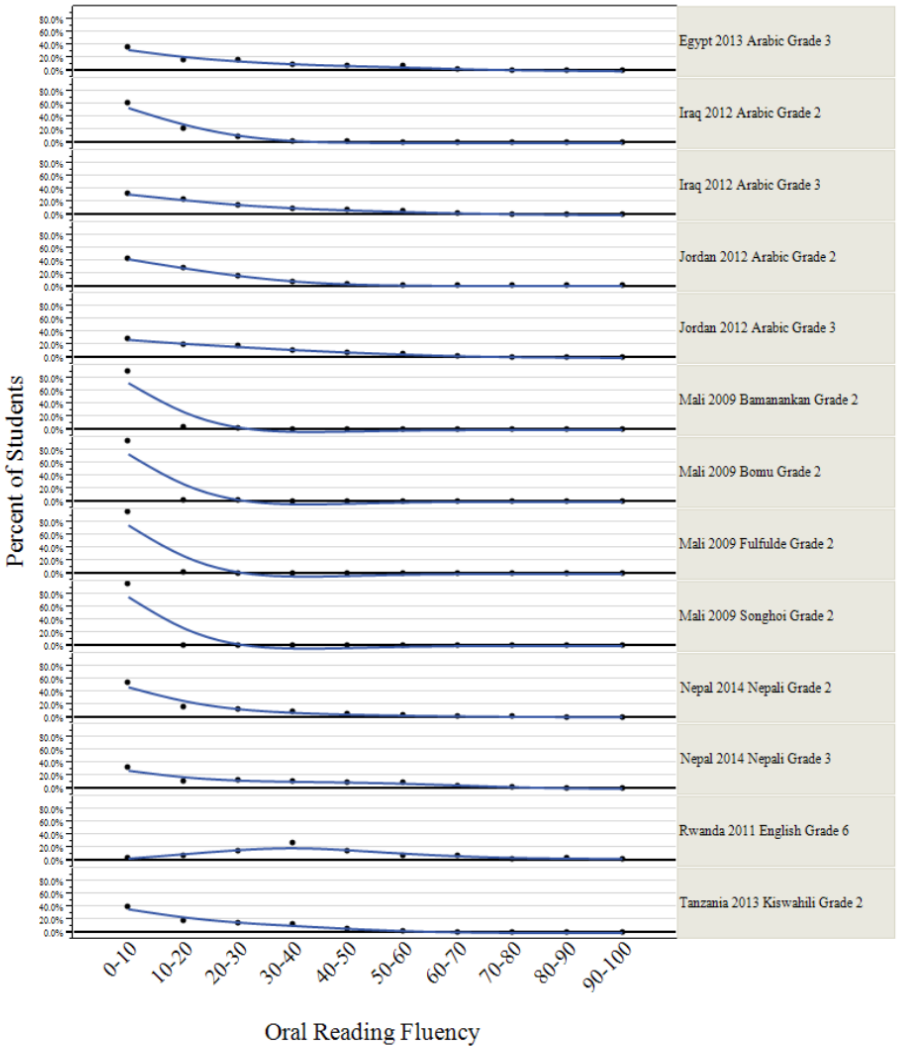
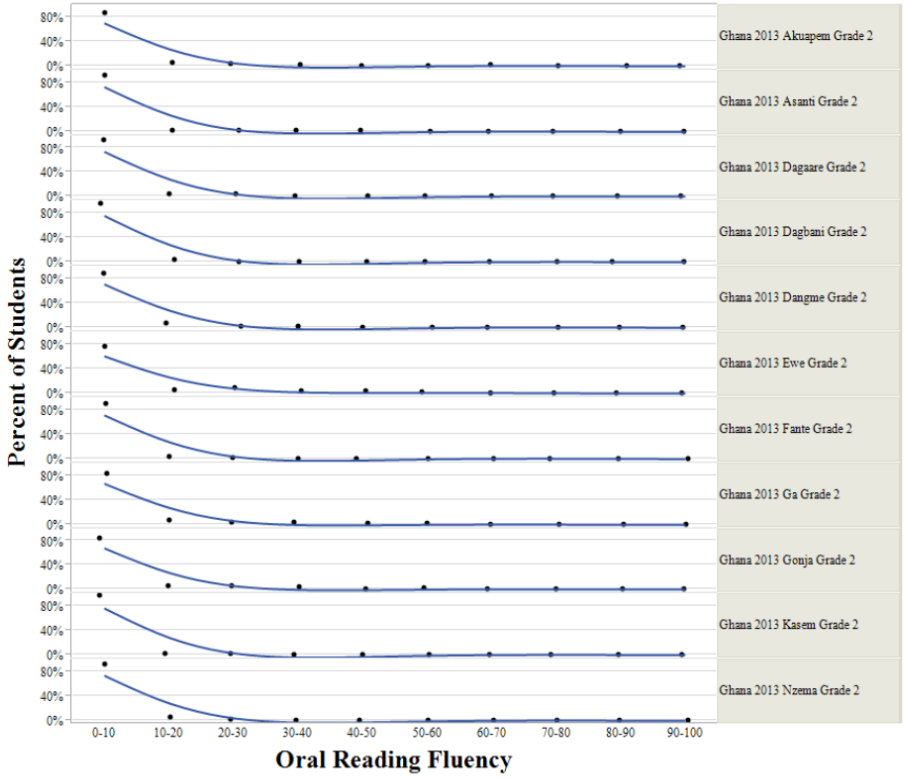


Table 3-2: Distribution of oral reading fluency scores by country, year, language and grade



Appendix 4. Composition of socio-economic status indices, by country

Methodology

The socio-economic status index is created by taking the first eigenvector from a principal components analysis of the socio-economic interview questions. This is done through an iterative process, with the variable being dropped if the coefficient is small or negative. The aim is to get the variance explained amongst the variables to be reasonably high (minimum 0.35) for the first eigenvector.

Table 4-1. Definitions of variables

Variable name	Question asked
Television	Does your family have a television?
Toilet	What type of toilet does your family use?
Electricity	Does your family have electricity?
Computer	Does your family have a computer?
Water	How does your family get drinking water?*
Mobile	Does your family have a mobile phone?
Fridge	Does your family have a fridge?
Motorbike	Does your family have a motorbike?
Vehicle	Does your family have a vehicle?
Bike	Does your family have a bike?
Radio	Does your family have a radio?

*Ordinal choices given.

Table 4-2. Linear coefficient composition of socio-economic status indices, by country

	Linear combination of variables composing socio-economic index variable										
Country	**Television**	**Toilet**	**Electricity**	**Computer**	**Water**	**Mobile**	**Fridge**	**Motorbike**	**Vehicle**	**Bike**	**Radio**
Nepal	0.5468		0.6119	0.5715							
Tanzania	0.4204	0.3699	0.3923	0.336	0.308	0.1446	0.4063	0.1427	0.3466		
Ghana	0.4757		0.437	0.3541	0.2291	0.2154	0.4674	0.0981	0.3261		0.1549
Guyana	0.4479	0.3119	0.4377			0.3521	0.4383	0.2241	0.2438	0.1815	0.2278
Malawi	0.4368	0.361	0.4266			0.2815	0.4307	0.2683	0.3087	0.1357	0.2156
Mali	0.4546	0.303	0.3585			0.363	0.3749	0.3565	0.3453	0.1245	0.1973
Senegal	0.4901	0.2696	0.4951			0.2508	0.4514	0.2155	0.2921		0.2089
Iraq		0.3497	0.4812	0.4891					0.3602	0.3583	0.3856
Jordan	0.4773	0.4126	0.4614	0.3697					0.2677	0.3159	0.2844
Nicaragua	0.4556		0.4544		0.3805	0.2982	0.3882		0.1825		
Rwanda	0.5419	0.4011	0.5139	0.4415		0.225					